Primary Production and Other Related Measurements in the Eastern Canadian Arctic During the Summer of 1983

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Rapport statistique canadien des sciences halieutiques et aquatiques

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Les numéros 1 à 25 de cette série ont été publiés à titre de Records statistiques, Service des pêches et de la mer. Les numéros 26-160 ont été publiés à titre de Rapports statistiques du Service des pêches et de la mer, Ministère des Pêches et de l'Environnement. Le nom de la série a été modifié à partir du numéro 161.

Le titre exact paraît au haut du résumé de chaque rapport.

Canadian Data Report

Fisheries and Aquatic Sciences No. 510

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Abstract

Irwin, B., Platt, T., and Caverhill, C. 1985. Primary production and other related measurements in the Eastern Canadian Arctic during the summer of 1983. Can. Data Rep. Fish. Aquat. Sci. No. 510: iv + 143p.

During the period, 28 July to 17 September, 1984, a series of primary productivity experiments were conducted on board CSS Hudson in the Labrador Sea, Davis Strait, Baffin Bay, Jones Sound and Lancaster Sound. In this report we make available the raw data and also the fitted light saturation parameters.

Résumé

Irwin, B., Platt T., and Caverhill, C. 1985. Primary production and other related measurements in the Eastern Canadian Arctic during the summer of 1983. Can. Data Rep. Fish. Aquat. Sci. No. 510: iv + 143p.

Pendant la période du 28 Juillet au 17 Septembre une série d'expériences de productivité primaire ont été effectuée à bord du CSS Hudson dans la mer Labrador, au détroit de Davis, de la baie de Baffin, au détroit de Jones et au détroit de Lancaster. Dans ce rapport nous présentons les données brutes sur ces expériences, ainsi que les paramètres qui furent calculées pour représenter les courbes de production en fonction de la lumière.

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Introduction

This is the ninth in a series of data reports giving the results of experiments on photosynthetic production versus light intensity for natural phytoplankton populations in the North Atlantic and adjacent waters north of 50°N. Samples were collected from CSS Hudson from 28 July to 17 September, 1983. From 28 July to 5 August this was a joint cruise with the Ocean Circulation Division of the Atlantic Oceanographic Laboratory (AOL), from 5 August to 17 August a joint cruise with the Metrology Division of AOL and from 1 September to 17 September a joint cruise with the Chemical Oceanography Division and the Ocean Circulation Division of AOL.

Sampling

Water samples were collected using a modified continuous pump sampler (Herman et al., 1984). The PT probe was replaced by a guildline model 8709 CTD and fluorescence was measured "in situ" using an Aquatracka® submersible fluorometer. Attenuance was measured with an Oregon® attenuance meter. The signals from the fluorometer and the attenuance meter were digitised in the CTD probe. Data was logged using an HP 9826 computer. Sampling depths were determined from physical (eg. mixed layer depth) or biological (eg. chlorophyll maximum) parameters at most stations. At stations where "in situ" productivity experiments were done, samples were collected from standard oceanographic depths (eg. 5,10,15,20 m etc.).

Methods

Productivity

Primary productivity was measured using the ^{14}C method and oxygen

evolution method. The ^{14}C method was essentially as described by Strickland and Parsons (1972). For light saturation experiments from 10 to 100 µci sodium bicarbonate ^{14}C was added to each bottle. The bottles contained approximately 100 mls of sample. A total of 42 light and 2 dark bottles were incubated for each light saturation experiment. Incubations were done in temperature controlled incubators illuminated by 2000 W tungsten-halogen lamps (New Haline OHS 2000) (Irwin et al., 1983). Incubation time was 4 hours. For in situ experiments 10 µci ^{14}C was added to each of 3 light and 1 dark bottles at each depth. Incubation periods ranged from 7 to 25 hours.

For oxygen evolution experiments, the high precision Winkler method of Williams and Jenkinsen (1982) was used. For "in situ" experiments, 2 time zero and 3 light and 2 dark bottles were filled from each depth. Time zero bottles were fixed immediately, dark bottles were incubated in a darkened tank with flowing sea water to maintain temperature control, and light bottles were deployed "in situ" at sampled depths. Light saturation experiments consisted of 42 light bottles, 5 dark bottles and 5 time zero bottles. Incubated bottles were placed in identical incubators to these used for ^{14}C experiments. Incubation times for both types of experiments were the same as for ^{14}C experiments.

Chlorophyll a

Replicate 100 ml samples were filtered onto 25 mm GF/F or 25 mm 1.0um Nuclepore filters. Filters were placed in glass vials containing 10 ml of 85% acetone and extracted for 24 hours at 0°C in the dark. The fluorometric technique of Yentsch and Menzel (1963) as modified by Holm Hansen et al., (1965) was used to estimate chlorophyll and phaeophytin concentration.

Organic Particulates

Samples for particulate carbon and nitrogen and adenosine triphosphate were collected at most depths. Precombusted Whatman GF/F glass fibre filters or 1.0 µm Nuclepore filters were used. Samples were analysed using methods described in Irwin et al., (1982).

Nutrients

Three inorganic nutrients were measured routinely from each sample. All analysis were carried out on board within a few hours of collection. Inorganic phosphate, silicate and nitrate were measured on a Technicon II autoanalyser using industrial methods 155-71W, 186-72W, and 158-71W respectively.

Incubation and Incident light

Photosynthetically Active Radiation (P.A.R.) was measured at each bottle position using a Biospherical Instruments quantum meter, (model OSL 100).

Total incident light was measured with an Eppley 40 Junction black and white pyranometer. Incident PAR was measured with a Licor Li 190S quantum sensor. The output from both instruments were integrated and logged each hour on a Licor Li 550 printing integrator.

Estimation of Photosynthetic Parameters

Measurements of specific production, P^B, and irradiance, I, were used to estimate parameters in the equation of Platt et al. 1981,

$$P^B = P_s(1-e^{-\alpha I/P_s})e^{-\beta I/P_s}$$

P_s (mg c mg chl^{-1} h^{-1}) is the light saturated rate of specific production in the absence of photoinhibition, α (mg c(mg chl)$^{-1}$ h^{-1} w^{-1} m^{-2}) is the

initial slope of the PI curve and β (same units as α) is a parameter that characterises photoinhibition. Complete details of the fitting routine are given in Irwin et al., (1982) and a discussion of the mathematical basis for this technique is in Irwin et al., (1980).

Acknowledgements

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Units

P = mg C $m^{-3}h^{-1}$(mg Chl)$^{-1}$

I = W m^{-2}

P_s= mg C mg $Chl^{-1}h^{-1}$

α = mg C(mg Chl)$^{-1}h^{-1}W^{-1}m^{-2}$

β = mg C(mg Chl)$^{-1}h^{-1}W^{-1}m^{-2}$

Organic particulate concentrates are in mg m^{-3} and nutrients are in mg at m^{-3}. The 90% confidence interval for P_s, α and β are shown in the closed brackets below the estimates for each parameter.

Light Saturation Data - ^{14}C

EASTERN ARCTIC 1983

LAT 45 27.0'N LONG 57 55.2'W DATE 29/07/83 DEPTH 0 M

I	P	I	P	I	P	I	P
427	6.92	383	6.21	335	6.28	327	5.82
315	5.78	136	5.67	120	5.36	108	5.43
104	5.10	96	4.73	77	5.53	58	4.11
49	3.22	44	3.08	44	2.91	42	2.39
32	3.35	27	1.95	23	1.58	20	1.45
19	1.18	13	.69	12	.54	10	.46
10	.36	9	.46	9	.36	7	.32
7	.26	6	.30	6	.18	5	.15
5	.10	5	.11	4	.14	4	.14
4	.07	3	.03	3	.08	3	.02
2	.11	3	.07	3	.03	3	.06
3	.03	2	.06				

PARAMETER VALUES

PS : 7.42 (6.00, 8.84)

ALPHA : .090 (.083, .095)

BETA : .0031 (-.0012, .0074)

FRACTION : WHOLE

SAMPLE TEMP 15.0 C

INCUBATION TEMP 14.0 C

CHLOROPHYLL : .42

CARBON : 398.

NITROGEN : 34.

PHOSPHATE : .22

NITRATE : .03

SILICATE : .85

ATP : .23

EASTERN ARCTIC 1983

LAT 45 27.0'N LONG 57 58.2'W DATE 29/07/83 DEPTH 0 M

I	P	I	P	I	P	I	P
598	5.34	757	5.71	765	6.10	447	5.82
544	6.04	478	6.25	339	5.42	391	6.22
275	6.59	231	5.40	247	6.30	195	5.48
171	5.16	179	5.42	136	5.65	118	5.05
132	5.23	104	5.10	81	4.38	102	4.24
79	4.34	57	3.54	58	3.19	47	2.74
41	2.41	36	1.79	31	1.65	26	1.35
25	1.27	19	.87	17	1.37	15	.50
13	.52	10	.31	8	.20	6	.15
5	.07	4	.11	3	.08		

PARAMETER VALUES

PS : 6.79
(6.35, 7.22)

ALPHA : .076
(.072, .080)

BETA : .0016
(.0007, .0025)

FRACTION : WHOLE

SAMPLE TEMP 15.0 C

INCUBATION TEMP 15.0 C

CHLOROPHYLL	: .42	PHOSPHATE	: .22
CARBON	: 398.	NITRATE	: .03
NITROGEN	: 34.	SILICATE	: .85
		ATP	: .23

EASTERN ARCTIC 1983

LAT 46 51.9'N LONG 52 03.3'W DATE 30/07/83 DEPTH 3 M

I	P	I	P	I	P	I	P
466	.39	267	.35	175	.61	171	.75
84	.82	598	.66	68	.93	37	.50
24	1.07	33	1.09	14	.86	11	.51
12	.36	8	.24	6	.73	7	.53
5	.40	3	.27	5	.18	3	.16
2	.27	3	.19	2	.24	2	.19

PARAMETER VALUES

PS : .93 (.82, 1.05)

ALPHA : .093 (.074, .112)

BETA : .0014 (.0007, .0021)

FRACTION : WHOLE

SAMPLE TEMP 14.4 C

INCUBATION TEMP 13.0 C

CHLOROPHYLL	.24	PHOSPHATE	.21
CARBON	193.	NITRATE	.02
NITROGEN	22.	SILICATE	.35
		ATP	.16

EASTERN ARCTIC 1983

LAT 46 51.9'N LONG 52 03.3'W DATE 30/07/83 DEPTH 3 M

I	P	I	P	I	P	I	P
470	.71	777	.83	797	.75	474	.98
606	.98	539	.82	359	.81	427	.74
367	.80	267	.84	339	.87	251	.85
195	.81	211	.70	183	.84	120	.56
144	.75	124	1.03	90	.85	101	.84
84	1.07	69	.99	66	.95	51	.69
40	.60	41	.43	28	.49	30	.50
19	.39	20	.30	14	.22	13	.26
10	.22	7	.19	8	.15	6	.13
6	.10	4	.06	3	.07		

PARAMETER VALUES

PS : .89 (.84, .94)

ALPHA : .026 (.023, .029)

BETA : .0011 (0.0000, .0063)

FRACTION : WHOLE

SAMPLE TEMP 14.4 C

INCUBATION TEMP 13.0 C

CHLOROPHYLL : .24

CARBON : 193.

NITROGEN : 22.

PHOSPHATE : .21

NITRATE : .32

SILICATE : .35

ATP : .16

EASTERN ARCTIC 1983

LAT 47 32.0'N LONG 46 00.3'W DATE 31/07/83 DEPTH 0 M

I	P	I	P	I	P	I	P
718	4.28	837	4.16	825	4.34	447	4.04
579	4.71	502	5.14	347	4.80	411	4.81
327	4.28	247	4.68	267	4.27	219	4.38
155	4.66	175	5.02	128	4.58	106	4.42
114	4.13	58	4.04	74	4.04	61	3.77
44	2.76	42	3.07	36	2.56	35	2.11
33	1.86	28	1.75	22	1.28	17	1.22
12	.75	15	.79	10	.63	10	.58
8	.35	7	.36	6	.23	6	.26
5	.12	4	.16	4	.11	3	.10
2	.03						

PARAMETER VALUES

PS : 5.08
(4.85, 5.31)

ALPHA : .091
(.086, .097)

BETA : .0011
(.0006, .0016)

FRACTION : WHOLE

SAMPLE TEMP 12.0 C

INCUBATION TEMP 13.0 C

CHLOROPHYLL	: .46	PHOSPHATE	: .15
CARBON	: 241.	NITRATE	: .01
NITROGEN	: 23.	SILICATE	: .64
		ATP	: .15

EASTERN ARCTIC 1983

LAT 49 32.0'N LONG 46 00.3'W DATE 31/07/83 DEPTH 0 M

I	P	I	P	I	P	I	P
718	4.90	742	5.23	698	4.63	518	5.28
550	5.73	502	5.14	359	5.23	411	5.45
319	4.94	307	5.12	287	5.62	215	5.28
136	5.14	171	5.76	136	5.12	94	4.60
110	5.38	89	5.26	63	3.94	69	4.29
65	4.36	46	2.86	49	3.99	38	2.17
38	2.92	29	1.89	28	1.32	20	1.09
23	1.31	16	.67	16	.98	12	.45
12	.40	9	.23	8	.25	7	.12
7	.14	5	.07	6	.08	4	.07
4	.06	3	.02				

PARAMETER VALUES

PS : 6.37 (5.90, 6.83)

ALPHA : .091 (.085, .097)

BETA : .0024 (.0013, .0035)

FRACTION : >1 MICRON

SAMPLE TEMP 12.0 C

INCUBATION TEMP 13.0 C

CHLOROPHYLL	.23	PHOSPHATE	.15
CARBON	-	NITRATE	.01
NITROGEN	-	SILICATE	.64
		ATP	.08

EASTERN ARCTIC 1983

LAT 49 32.0'N LONG 46 00.3'W DATE 31/07/93 DEPTH 0 M

I	P	I	P	I	P	I	P
718	3.71	742	3.37	698	3.83	518	3.93
502	3.83	359	4.47	411	3.92	319	4.48
307	3.89	287	3.66	215	4.14	136	4.16
171	3.74	136	4.57	84	4.08	110	3.45
89	4.30	63	3.54	69	3.35	55	4.35
46	3.40	49	3.10	38	2.30	38	2.41
29	1.49	28	1.78	20	1.11	23	1.09
16	.79	16	.91	12	.32	12	.28
9	.07	8	.03	7	.13	6	.05

PARAMETER VALUES

PS :	ALPHA :	BETA :
4.39	.087	.0022
(4.48, 5.28)	(.079, .095)	(.0011, .0032)

FRACTION : <1 MICRON

SAMPLE TEMP	12.0 C	INCUBATION TEMP	13.0 C
CHLOROPHYLL :	.13	PHOSPHATE :	.15
CARBON :	340.	NITRATE :	.01
NITROGEN :	41.	SILICATE :	.64
		ATP :	.04

EASTERN ARCTIC 1983

LAT 51 16.8'N LONG 44 48.0'W DATE 01/08/83 DEPTH 30 M

I	P	I	P	I	P	I	P
666	.14	757	.11	777	.07	526	.12
586	.13	510	.17	367	.21	407	.15
315	.27	231	.39	195	.36	179	.48
167	.39	132	.46	116	.45	82	.49
72	.50	50	.43	41	.47	37	.38
26	.43	26	.32	19	.38	19	.40
14	.36	15	.41	12	.32	11	.36
9	.38	8	.24	7	.19	6	.21
5	.14	5	.18	4	.11	4	.09
3	.07						

PARAMETER VALUES

PS : .56 (.53, .59)

ALPHA : .039 (.036, .043)

BETA : .0013 (.0011, .0015)

FRACTION : WHOLE

SAMPLE TEMP 12.6 C

INCUBATION TEMP 12.5 C

CHLOROPHYLL	2.15	PHOSPHATE	.26
CARBON	409.	NITRATE	.28
NITROGEN	57.	SILICATE	1.73
		ATP	.26

EASTERN ARCTIC 1983

LAT 51 16.8'N LONG 44 48.0'W DATE 01/08/83 DEPTH 30 M

I	P	I	P	I	P	I	P
750	.05	698	.07	606	.04	486	.06
502	.06	478	.08	287	.14	395	.08
371	.11	195	.23	231	.17	247	.20
120	.24	140	.21	159	.24	76	.22
108	.24	57	.22	68	.21	76	.25
45	.21	53	.23	33	.23	36	.21
25	.24	28	.21	19	.18	20	.15
14	.14	14	.14	11	.11	10	.08
8	.07	8	.07	6	.04	6	.04
5	.03	5	.03	4	.02	3	.03
3	.02						

PARAMETER VALUES

PS : .33 (.31, .35)

ALPHA : .012 (.011, .013)

BETA : .0010 (.0009, .0011)

FRACTION : >1 MICRON

SAMPLE TEMP 12.6 C

INCUBATION TEMP 12.5 C

CHLOROPHYLL	:	1.66	PHOSPHATE	: .24
CARBON	:	-	NITRATE	: .29
NITROGEN	:	-	SILICATE	: 1.73
			ATP	: .21

EASTERN ARCTIC 1963

LAT 51 16.8'N LONG 44 46.0'W DATE 01/08/63 DEPTH 30 M

I	P	I	P	I	P	I	P
502	.25	395	.27	195	.24	231	.24
247	.25	120	.22	140	.25	76	.17
94	.18	108	.18	57	.16	45	.20
33	.21	36	.20	28	.19	19	.16
20	.17	8	.18	6	.14	6	.09
5	.10	3	.08	3	.05		

PARAMETER VALUES

PS : .21 (.20, .23)

ALPHA : .026 (.021, .031)

BETA : .0000 (-.0001, .0001)

FRACTION : <1 MICRON

SAMPLE TEMP 12.6 C

INCUBATION TEMP 12.5 C

CHLOROPHYLL	.32	PHOSPHATE	.26
CARBON	92.	NITRATE	.28
NITROGEN	13.	SILICATE	1.73
		ATP	.66

EASTERN ARCTIC 1983

LAT 52 01.7'N LONG 46 30.3'W DATE 02/09/83 DEPTH 27 M

I	P	I	P	I	P	I	P
666	.25	757	.32	777	.27	526	.29
286	.30	510	.26	367	.33	315	.38
231	.45	295	.31	195	.41	179	.39
167	.39	132	.54	112	.53	116	.40
98	.49	78	.52	82	.47	50	.37
41	.43	37	.46	26	.49	26	.48
19	.41	19	.39	14	.35	15	.49
12	.45	9	.41	8	.16	7	.24
6	.15	5	.14	5	.09	4	.11
4	.19	3	.18				

PARAMETER VALUES

PS : .51 (.48, .54)

ALPHA : .049 (.043, .054)

BETA : .0005 (.0004, .0006)

FRACTION : WHOLE

SAMPLE TEMP 10.3 C

CHLOROPHYLL : 1.53

CARBON : 191.

NITROGEN : 29.

INCUBATION TEMP 10.4 C

PHOSPHATE : .31

NITRATE : 2.00

SILICATE : 1.53

ATP : .21

EASTERN ARCTIC 1983

LAT 52 01.7'N LONG 46 00.0'W DATE 02/08/83 DEPTH 27 M

I	P	I	P	I	P	I	P
750	.04	698	.07	606	.08	486	.19
502	.12	478	.24	287	.37	395	.32
371	.36	195	.41	231	.37	247	.45
120	.42	76	.49	94	.46	108	.47
87	.45	68	.44	76	.43	45	.46
53	.42	33	.39	36	.47	25	.43
28	.39	19	.39	20	.36	14	.32
14	.29	11	.26	10	.25	8	.20
8	.20	6	.14	6	.12	5	.12
5	.10	4	.08	3	.05	3	.04

PARAMETER VALUES

PS :	ALPHA :	BETA :
.57	.029	.0012
(.54, .60)	(.027, .032)	(.0010, .0014)

FRACTION : >1 MICRON

SAMPLE TEMP	10.3 C	INCUBATION TEMP	10.4 C
CHLOROPHYLL :	.91	PHOSPHATE :	.31
CARBON :	-	NITRATE :	2.00
NITROGEN :	-	SILICATE :	1.53
		ATP :	.12

EASTERN ARCTIC 1983

LAT 52 01.7'N		LONG 46 00.0'W		DATE 02/08/83		DEPTH 27 M	
I	P	I	P	I	P	I	P
606	.07	486	.18	502	.15	478	.10
287	.25	395	.20	195	.26	231	.26
159	.26	94	.24	57	.24	68	.25
76	.26	45	.27	53	.22	33	.18
36	.25	25	.18	28	.18	19	.24
20	.25	14	.27	14	.19	11	.24
10	.20	8	.17	8	.14	6	.14
6	.11	5	.09	4	.09	3	.09
3	.03						

PARAMETER VALUES

PS : .27 (.25, .28)

ALPHA : .030 (.026, .034)

BETA : .0033 (.0002, .0034)

FRACTION : <1 MICRON

SAMPLE TEMP	10.3 C	INCUBATION TEMP	10.4 C
CHLOROPHYLL :	.42	PHOSPHATE :	.31
CARBON :	87.	NITRATE :	2.00
NITROGEN :	15.	SILICATE :	1.53
		ATP :	.05

EASTERN ARCTIC 1983

LAT 54 18.0'N		LONG 51 37.0'W		DATE 03/08/83		DEPTH 15 M	
I	P	I	P	I	P	I	P
331	1.13	447	.84	315	1.01	231	1.13
255	1.09	215	1.06	175	1.02	104	1.25
112	1.23	71	1.08	46	1.08	29	.93
39	.91	18	.74	17	.69	12	.72
13	.52	9	.48	10	.43	7	.29
6	.23	6	.20	4	.17	4	.12
3	.15	3	.06	2	.05	2	.35
2	.06	2	.02				

PARAMETER VALUES

PS : 1.33 (1.26, 1.40)

ALPHA : .054 (.051, .058)

BETA : .0011 (.0008, .0015)

FRACTION : WHOLE

SAMPLE TEMP	4.3 C	INCUBATION TEMP	5.0 C
CHLOROPHYLL :	.44	PHOSPHATE :	.44
CARBON :	135.	NITRATE :	2.29
NITROGEN :	25.	SILICATE :	3.54
		ATP :	.15

EASTERN ARCTIC 1983

LAT 54 18.0'N LONG 51 37.0'W DATE 03/08/83 DEPTH 15 M

I	P	I	P	I	P	I	P
315	1.42	303	1.30	259	1.14	140	1.28
167	1.49	112	1.58	112	1.52	82	1.52
77	1.48	85	1.51	62	1.24	64	1.17
43	1.41	49	1.37	38	1.20	37	1.24
31	.76	28	.89	23	.64	21	.75
17	.46	14	.47	12	.38	11	.25
10	.29	8	.26	9	.17	7	.15
6	.11	5	.08	5	.06	4	.06
4	.03	3	.07	3	.01	2	.01
2	.01						

PARAMETER VALUES

PS : 2.00
(1.72, 2.27)

ALPHA : .042
(.039, .045)

BETA : .0030
(.0014, .0046)

FRACTION : >1 MICRON

SAMPLE TEMP 4.3 C

INCUBATION TEMP 5.0 C

CHLOROPHYLL	.27	PHOSPHATE	.44
CARBON	-	NITRATE	2.29
NITROGEN	-	SILICATE	3.54
		ATP	.09

EASTERN ARCTIC 1983

LAT 54 18.0'N LONG 51 37.0'W DATE 03/08/83 DEPTH 15 M

I	P	I	P	I	P	I	P
315	.35	303	.46	140	.44	167	.40
112	.37	116	.36	112	.42	82	.42
59	.48	42	.36	64	.45	38	.41
37	.43	14	.33	12	.23	11	.21
10	.20	8	.12	8	.17	7	.18
6	.11	5	.07	5	.05	4	.04
2	.04	2	.02				

PARAMETER VALUES

PS : .44 (.41, .47)

ALPHA : .026 (.024, .029)

BETA : .0002 (0.0000, .0004)

FRACTION : <1 MICRON

SAMPLE TEMP	4.3 C	INCUBATION TEMP	5.0 C
CHLOROPHYLL :	.22	PHOSPHATE :	.44
CARBON :	215.	NITRATE :	2.29
NITROGEN :	19.	SILICATE :	3.54
		ATP :	.04

EASTERN ARCTIC 1983

LAT 53 21.7'N LONG 54 25.7'W DATE 04/08/83 DEPTH 60 M

I	P	I	P	I	P	I	P
359	.11	427	.06	367	.08	263	.18
339	.16	267	.23	183	.37	211	.23
191	.29	151	.48	151	.49	112	.53
128	.61	108	.61	73	.74	55	.74
52	.73	49	.72	37	.69	24	.76
26	.70	18	.60	13	.73	13	.71
9	.68	7	.48	5	.38	4	.23
2	.04	2	.02	2	.06		

PARAMETER VALUES

PS : 1.03 (.96, 1.11) ALPHA : .084 (.076, .093) BETA : .0058 (.0048, .0068)

FRACTION : WHOLE

SAMPLE TEMP -1.6 C INCUBATION TEMP 1.3 C

CHLOROPHYLL	1.62	PHOSPHATE	1.43
CARBON	141.	NITRATE	10.36
NITROGEN	19.	SILICATE	9.41
		ATP	.14

EASTERN ARCTIC 1983

LAT 53 21.7'N LONG 54 25.7'W DATE 04/08/83 DEPTH 60 M

I	P	I	P	I	P	I	P
311	.11	379	.09	371	.13	231	.21
275	.19	231	.19	148	.35	187	.33
171	.30	112	.42	140	.39	75	.44
88	.48	97	.39	37	.40	44	.43
27	.47	29	.42	20	.44	19	.45
14	.39	14	.37	11	.37	10	.34
8	.31	9	.39	6	.22	6	.28
6	.23	4	.16	3	.13	3	.15
2	.12	3	.13	2	.10	2	.06
2	.05	2	.04	2	.03		

PARAMETER VALUES

PS : .57 (.54, .60) ALPHA : .054 (.050, .058) BETA : .0022 (.0019, .0025)

FRACTION : >1 MICRON

SAMPLE TEMP -1.6 C INCUBATION TEMP 1.0 C

CHLOROPHYLL	.67	PHOSPHATE	1.43
CARBON	-	NITRATE	10.36
NITROGEN	-	SILICATE	9.41
		ATP	.09

EASTERN ARCTIC 1983

LAT 53 21.7'N LONG 54 25.7'W DATE 04/09/83 DEPTH 60 M

I	P	I	P	I	P	I	P
311	.01	379	.00	371	.03	231	.05
231	.09	187	.15	171	.19	112	.26
140	.22	88	.24	97	.27	54	.33
58	.23	37	.22	44	.27	27	.21
28	.21	20	.27	19	.20	11	.25
10	.25	8	.25	8	.21	6	.21
4	.19	4	.16	3	.17	3	.17
2	.17	3	.12	2	.09	2	.06
2	.09	2	.10	2	.07		

PARAMETER VALUES

PS : .29 (.27, .31)

ALPHA : .063 (.055, .070)

BETA : .0012 (.0010, .0015)

FRACTION : <1 MICRON

SAMPLE TEMP -1.6 C

INCUBATION TEMP 1.0 C

CHLOROPHYLL	.43	PHOSPHATE	1.43
CARBON	100.	NITRATE	10.36
NITROGEN	15.	SILICATE	9.41
		ATP	.09

EASTERN ARCTIC 1983

LAT 54 53.5'N LONG 54 14.3'W DATE 05/03/83 DEPTH 40 M

I	P	I	P	I	P	I	P
319	.22	379	.32	311	.30	243	.41
271	.44	211	.43	175	.46	215	.44
151	.44	159	.47	116	.45	111	.55
67	.52	44	.40	40	.53	33	.41
27	.35	25	.42	19	.32	22	.39
16	.28	11	.19	8	.17	7	.20
6	.23	5	.13	3	.13	3	.10
3	.19	2	.07	2	.04	2	.02
2	.10						

PARAMETER VALUES

PS : .52 (.56, .68)

ALPHA : .027 (.024, .030)

BETA : .0012 (.0009, .0016)

FRACTION : WHOLE

SAMPLE TEMP -1.4 C

INCUBATION TEMP -1.0 C

CHLOROPHYLL : .36

CARBON : 102.

NITROGEN : 29.

PHOSPHATE : 1.42

NITRATE : 10.14

SILICATE : 12.42

ATP : .05

EASTERN ARCTIC 1983

LAT 54 53.5'N LONG 54 14.3'W DATE 05/08/83 DEPTH 40 M

I	P	I	P	I	P	I	P
331	.53	411	.44	343	.54	211	.53
291	.60	243	.46	167	.58	159	.52
112	.59	108	.63	78	.59	76	.45
54	.57	52	.59	37	.57	38	.50
25	.67	31	.63	18	.56	21	.65
15	.46	15	.45	11	.35	11	.33
7	.28	8	.40	6	.21	8	.24
5	.18	4	.17	4	.13	3	.12
3	.08	3	.07	2	.08	2	.05
2	.04	2	.06	2	.04		

PARAMETER VALUES

PS : .66 (.64, .69)

ALPHA : .053 (.049, .057)

BETA : .0035 (.0003, .0006)

FRACTION : >1 MICRON

SAMPLE TEMP -1.4 C

INCUBATION TEMP -1.0 C

CHLOROPHYLL	.13	PHOSPHATE	1.42
CARBON	-	NITRATE	10.14
NITROGEN	-	SILICATE	12.42
		ATP	.04

EASTERN ARCTIC 1983

LAT 54 00.0'N LONG 56 51.0'W DATE 06/08/83 DEPTH [illegible] M

I	P	I	P	I	P	I	P
311	1.70	255	1.96	195	1.82	211	1.93
183	2.00	136	2.02	167	2.08	136	1.6[illegible]
108	1.73	120	1.91	104	1.98	7[illegible]	1.8[illegible]
82	1.97	72	2.03	54	1.89	39	1.47
39	1.95	25	1.58	28	1.63	20	1.26
21	1.21	16	1.08	16	.91	12	.57
12	.72	9	.39	9	.53	7	.3[illegible]
6	.34	5	.20	5	.25	4	.1[illegible]
3	.13	3	.11	2	.09	2	.0[illegible]
2	.01						

PARAMETER VALUES

PS : 2.19 (2.05, 2.32)

ALPHA : .095 (.079, .090)

BETA : .0016 (.0007, .0024)

FRACTION : WHOLE

SAMPLE TEMP 5.7 C

INCUBATION TEMP 6.5 C

CHLOROPHYLL	.34	PHOSPHATE	.34
CARBON	146.	NITRATE	.00
NITROGEN	31.	SILICATE	1.99
		ATP	.11

EASTERN ARCTIC 1983

LAT 54 00.0'N LONG 56 51.0'W DATE 06/08/83 DEPTH 5 M

I	P	I	P	I	P	I	P
291	1.85	355	1.81	283	1.74	203	1.96
223	1.79	203	1.92	132	1.67	159	1.37
144	1.72	95	1.82	118	1.76	108	1.78
76	1.93	82	1.95	78	1.68	61	1.73
39	1.53	45	1.40	29	1.51	31	1.29
21	1.16	22	.92	16	.67	17	.63
12	.45	12	.49	8	.29	10	.32
7	.19	7	.21	5	.13	5	.15
4	.08	4	.09	3	.04	3	.05
3	.03	2	.02	2	.02	2	.01
2	.01						

PARAMETER VALUES

PS : 2.03 (1.89, 2.18)

ALPHA : .058 (.054, .062)

BETA : .0009 (.0002, .0016)

FRACTION : >1 MICRON

SAMPLE TEMP 5.7 C

INCUBATION TEMP 6.5 C

CHLOROPHYLL	.29	PHOSPHATE	.36
CARBON	-	NITRATE	.00
NITROGEN	-	SILICATE	1.99
		ATP	.11

EASTERN ARCTIC 1983

LAT 54 03.0'N LONG 56 51.0'W DATE 05/08/83 DEPTH 5 M

I	P	I	P	I	P	I	P
355	.31	283	.33	203	.42	223	.39
203	.35	159	.61	144	.65	96	.54
76	.67	82	.64	78	.60	61	.60
39	.53	45	.64	21	.64	33	.51
16	.60	17	.43	12	.58	12	.39
8	.31	10	.21	7	.40	7	.41
4	.26	3	.19	3	.26	2	.16
2	.15						

PARAMETER VALUES

PS : .73 (.67, .79) ALPHA : .063 (.056, .071) BETA : .0017 (.0012, .0023)

FRACTION : <1 MICRON

SAMPLE TEMP	5.7 C	INCUBATION TEMP	6.5 C
CHLOROPHYLL	.08	PHOSPHATE	.36
CARBON	170.	NITRATE	.00
NITROGEN	13.	SILICATE	1.99
		ATP	.04

EASTERN ARCTIC 1983

LAT 55 39.3'N LONG 56 28.7'W DATE 07/09/83 DEPTH 46 M

T	P	T	P	T	P	T	P
327	.61	395	.41	335	.53	247	1.16
319	.91	287	.93	175	1.10	207	1.00
136	1.12	167	.97	132	1.02	82	1.09
86	1.03	61	1.06	37	.96	29	1.01
24	1.02	17	.77	18	1.00	13	.49
12	.58	10	.46	10	.49	7	.50
7	.38	5	.22	5	.37	5	.24
4	.22	4	.13	3	.12	3	.04
3	.06	2	.04	2	.06	2	.19

PARAMETER VALUES

PS : 1.39
(1.29, 1.50)

ALPHA : .064
(.059, .070)

BETA : .0027
(.0020, .0034)

FRACTION : WHOLE

SAMPLE TEMP .9 C

INCUBATION TEMP 3.0 C

CHLOROPHYLL	.41	PHOSPHATE	.47
CARBON	172.	NITRATE	1.18
NITROGEN	31.	SILICATE	2.37
		ATP	.12

EASTERN ARCTIC 1983

LAT 55 39.3'N LONG 56 28.7'W DATE 07/03/83 DEPTH 44 M

I	P	I	P	I	P	I	P
327	.49	399	.35	291	.51	215	.71
263	.52	219	.74	140	.89	171	.83
148	1.00	94	1.05	104	1.00	67	.95
79	.92	73	1.00	47	.93	37	.88
41	1.05	26	.95	32	.87	19	.77
14	.76	16	.65	12	.47	12	.39
9	.30	8	.28	6	.22	7	.35
4	.19	4	.13	4	.17	4	.12
3	.07	3	.09	2	.06	2	.04
2	.04	2	.03	2	.03		

PARAMETER VALUES

PS : 1.43 (1.33, 1.53)

ALPHA : .051 (.048, .054)

BETA : .0048 (.0039, .0057)

FRACTION : >1 MICRON

SAMPLE TEMP .9 C

INCUBATION TEMP 3.0 C

CHLOROPHYLL	.32	PHOSPHATE	.47
CARBON	-	NITRATE	1.05
NITROGEN	-	SILICATE	2.41
		ATP	.05

EASTERN ARCTIC 1983

LAT 55 39.3'N LONG 56 28.7'W DATE 07/08/83 DEPTH 44 M

I	P	I	P	I	P	I	P
327	.35	291	.40	215	.57	263	.45
67	.79	79	.72	47	.64	37	.76
41	.79	26	.64	32	.67	19	.76
24	.70	16	.55	12	.69	12	.55
9	.50	8	.49	6	.52	7	.31
4	.29	4	.42	4	.34	4	.32
3	.41	3	.16	2	.24	2	.12
2	.19	2	.04				

PARAMETER VALUES

PS : .78 (.74, .82)

ALPHA : .101 (.091, .113)

BETA : .0016 (.0012, .0020)

FRACTION : <1 MICRON

SAMPLE TEMP .9 C

INCUBATION TEMP 3.0 C

CHLOROPHYLL	.10	PHOSPHATE	.47
CARBON	191.	NITRATE	1.05
NITROGEN	56.	SILICATE	2.41
		ATP	.04

EASTERN ARCTIC 1983

LAT 58 10.0'N LONG 56 59.0'W DATE 08/09/83 DEPTH 43 M

I	P	I	P	I	P	I	P
195	.18	235	.15	179	.13	132	.29
163	.30	140	.30	98	.40	112	.35
94	.42	66	.63	78	.44	43	.28
55	.59	32	.65	30	.59	24	.70
22	.60	18	.56	15	.66	12	.62
12	.56	9	.51	6	.44	6	.34
4	.29	4	.21	4	.19	2	.15
2	.17	2	.09	2	.12	1	.06
1	.07	.8	.05	.7	.02	.6	.05
.5	.03						

PARAMETER VALUES

PS : .93 (.88, .97)

ALPHA : .085 (.080, .089)

BETA : .0076 (.0057, .0085)

FRACTION : WHOLE

SAMPLE TEMP .6 C

INCUBATION TEMP 2.5 C

CHLOROPHYLL : 5.06

CARBON : 250.

NITROGEN : -

PHOSPHATE : .50

NITRATE : 2.55

SILICATE : 1.67

ATP : .18

EASTERN ARCTIC 1983

LAT 58 10.0'N		LONG 56 59.0'W		DATE 08/08/83		DEPTH 43 M	
I	P	I	P	I	P	I	P
155	.26	215	.20	183	.20	124	.33
144	.26	128	.35	82	.63	102	.51
96	.63	57	.77	63	.85	64	.88
38	.92	45	.85	40	.80	26	.90
18	.87	14	.86	15	.75	10	.77
10	.73	8	.69	7	.81	5	.56
5	.53	3	.44	4	.39	3	.23
3	.26	2	.18	2	.21	1	.10
1	.13	1	.05	1	.08	.7	.04
.8	.04	.6	.03	.6	.03	.4	.02

PARAMETER VALUES

PS :	ALPHA :	BETA :
1.35	.127	.0130
(1.26, 1.44)	(.120, .135)	(.0110, .0150)

FRACTION : >1 MICRON

SAMPLE TEMP	.6 C	INCUBATION TEMP	2.5 C
CHLOROPHYLL :	5.95	PHOSPHATE :	.90
CARBON :	-	NITRATE :	2.24
NITROGEN :	-	SILICATE :	1.67
		ATP :	.25

EASTERN ARCTIC 1983

LAT 58 10.0'N LONG 56 59.0'W DATE 09/08/83 DEPTH 43 M

I	P	I	P	I	P	I	P
155	.04	215	.02	183	.02	144	.04
82	.08	57	.09	63	.08	66	.10
29	.10	18	.10	15	.09	10	.09
8	.10	7	.09	5	.09	5	.07
3	.07	4	.08	3	.09	3	.05
2	.06	2	.03	1	.04	1	.04
1	.05	1	.01	.7	.05	.8	.03
.6	.02	.4	.04				

PARAMETER VALUES

PS : .11 (.10, .12)

ALPHA : .035 (.031, .040)

BETA : .0007 (.0005, .0009)

FRACTION : <1 MICRON

SAMPLE TEMP .6 C

INCUBATION TEMP 2.5 C

CHLOROPHYLL : .51

CARBON : 210.

NITROGEN : 15.

PHOSPHATE : .50

NITRATE : 2.24

SILICATE : 1.67

ATP : .04

EASTERN ARCTIC 1983

LAT 61 50.3'N LONG 57 53.8'W DATE 09/09/83 DEPTH 10 M

I	P	I	P	I	P	I	P
203	.87	235	.81	203	.99	144	.96
159	.95	132	.95	100	.89	96	.93
81	.92	46	.86	57	.91	60	.85
38	.88	28	.99	23	.93	19	.91
16	.94	14	.89	12	.92	10	.80
9	.73	7	.59	7	.53	5	.44
5	.39	4	.30	3	.30	2	.18
2	.20	2	.12	2	.12	1	.06
1	.07	1	.03	.8	.05	.6	.01
.6	.02	.5	.03				

PARAMETER VALUES

PS : .98 (.94, 1.01)

ALPHA : .126 (.118, .134)

BETA : .0005 (.0002, .0007)

FRACTION : WHOLE

SAMPLE TEMP 3.4 C

INCUBATION TEMP 3.5 C

CHLOROPHYLL : 2.67

CARBON : 1190.

NITROGEN : 130.

PHOSPHATE : .37

NITRATE : .08

SILICATE : 1.45

ATP : .17

EASTERN ARCTIC 1983

LAT 61 50.3'N LONG 57 53.8'W DATE 09/08/83 DEPTH 10 M

I	P	I	P	I	P	T	P
171	.88	179	.86	124	.91	155	.80
128	.92	79	.93	98	.93	84	.86
50	.93	65	.84	35	.89	25	.92
30	.89	19	.91	22	.88	13	.91
16	.86	10	.74	12	.80	7	.81
8	.65	5	.57	6	.54	4	.41
4	.34	3	.21	2	.29	2	.19
1	.11	2	.11	1	.08	1	.07
.7	.04	.8	.04	.6	.02	.6	.02
.4	.01						

PARAMETER VALUES

PS : .97 (.93, 1.00)

ALPHA : .137 (.128, .146)

BETA : .0007 (.0003, .0011)

FRACTION : >1 MICRON

SAMPLE TEMP	3.4 C	INCUBATION TEMP	3.5 C
CHLOROPHYLL :	1.10	PHOSPHATE :	.37
CARBON :	-	NITRATE :	.01
NITROGEN :	-	SILICATE :	1.45
		ATP :	.11

EASTERN ARCTIC 1983

LAT 61 50.3'N		LONG 57 53.8'W		DATE 09/08/83		DEPTH 10 M	
I	P	I	P	I	P	I	P
171	.65	124	.64	155	.63	79	.65
98	.55	84	.55	50	.65	56	.61
35	.69	38	.68	37	.67	25	.65
30	.60	22	.67	13	.66	16	.58
10	.54	12	.61	7	.51	5	.49
6	.36	4	.35	4	.34	3	.17
3	.25	2	.33	2	.12	1	.11
2	.12	1	.07	1	.07	.7	.04
.8	.03	.6	.02	.4	.01		

PARAMETER VALUES

PS :	ALPHA :	BETA :
.57	.111	.0006
(.64, .70)	(.102, .121)	(.0002, .0009)

FRACTION : <1 MICRON

SAMPLE TEMP	3.4 C	INCUBATION TEMP	3.5 C
CHLOROPHYLL :	.51	PHOSPHATE :	.37
CARBON :	179.	NITRATE :	.61
NITROGEN :	18.	SILICATE :	1.45
		ATP :	.67

EASTERN ARCTIC 1983

LAT 64 09.4'N LONG 57 12.6'W DATE 10/08/83 DEPTH 10 M

I	P	I	P	I	P	I	P
199	.87	247	.80	203	.96	144	.90
191	.94	144	.87	104	.89	128	.86
104	.85	68	.93	88	.83	66	.83
48	.93	57	.88	52	.89	35	.91
33	.81	24	.91	25	.94	18	.92
18	.89	12	.80	14	.84	10	.62
10	.74	7	.57	7	.54	5	.41
5	.42	4	.31	3	.20	3	.18
2	.12	2	.11	1	.09	1	.07
1	.09	.8	.06	.7	.01	.5	.04

PARAMETER VALUES

PS : .34 (.91, .97)

ALPHA : .115 (.109, .122)

BETA : .0004 (.0001, .0006)

FRACTION : WHOLE

SAMPLE TEMP 3.8 C

INCUBATION TEMP 3.0 C

CHLOROPHYLL : 2.30

CARBON : 710.

NITROGEN : 100.

PHOSPHATE : .32

NITRATE : .00

SILICATE : .72

ATP : .20

EASTERN ARCTIC 1983

LAT 64 09.4'N LONG 57 12.6'W DATE 10/08/83 DEPTH 10 M

I	P	I	P	I	P	I	P
193	1.10	239	1.12	197	.31	136	.98
136	1.07	97	1.09	108	1.02	95	.94
66	.95	63	1.02	45	.97	44	.95
48	.99	35	.98	31	.89	12	.78
11	.77	9	.64	8	.67	6	.45
6	.50	4	.33	4	.31	3	.22
3	.21	2	.14	3	.11	2	.06
2	.06	1	.05	1	.05	.8	.02
.7	.03	.7	.01	.6	.00	.5	.00

PARAMETER VALUES

PS : 1.01 (.97, 1.04)

ALPHA : .100 (.094, .106)

BETA : .0000 (-.0003, .0003)

FRACTION : >1 MICRON

SAMPLE TEMP 3.8 C

INCUBATION TEMP 3.0 C

CHLOROPHYLL	.97	PHOSPHATE	.32
CARBON	-	NITRATE	.00
NITROGEN	-	SILICATE	.59
		ATP	.13

EASTERN ARCTIC 1983

LAT 64 09.4'N		LONG 57 12.6'W		DATE 10/09/83		DEPTH 10 M	
I	P	I	P	I	P	I	P
187	.32	136	.34	171	.37	136	.35
108	.45	95	.40	66	.44	68	.48
63	.44	45	.55	44	.50	45	.48
35	.49	31	.54	16	.59	15	.55
12	.52	11	.53	9	.37	6	.36
6	.34	4	.26	4	.23	3	.16
2	.12	3	.10	2	.08	2	.08
1	.06	1	.05	.8	.04	.7	.03
.7	.03	.6	.03	.5	.02		

PARAMETER VALUES

PS :	ALPHA :	BETA :
(.59, .65)	(.076, .086)	(.0020, .0028)
.62	.081	.0024

FRACTION : <1 MICRON

SAMPLE TEMP	3.8 C	INCUBATION TEMP	3.0 C
CHLOROPHYLL :	.56	PHOSPHATE :	.32
CARBON :	140.	NITRATE :	.00
NITROGEN :	-	SILICATE :	.69
		ATP :	.06

EASTERN ARCTIC 1983

LAT 67 43.6'N LONG 57 02.9'W DATE 11/08/83 DEPTH 40 M

I	P	I	P	I	P	I	P
311	.17	335	.11	263	.15	231	.33
263	.26	183	.31	151	.48	175	.44
140	.51	100	.68	33	.66	27	.72
24	.63	17	.68	16	.71	12	.57
9	.46	8	.40	7	.29	6	.28
5	.21	4	.21	3	.13	2	.08
2	.08	2	.04	2	.06	1	.03
1	.04	.9	.01	.6	.00		

PARAMETER VALUES

PS : 1.18 (1.04, 1.31)

ALPHA : .059 (.055, .063)

BETA : .0073 (.0057, .0089)

FRACTION : WHOLE

SAMPLE TEMP 1.2 C

INCUBATION TEMP 2.5 C

CHLOROPHYLL : 10.49

CARBON : 1220.

NITROGEN : 170.

PHOSPHATE : .53

NITRATE : 2.49

SILICATE : .71

ATP : .57

EASTERN ARCTIC 1983

LAT 67 43.6'N LONG 57 02.9'W DATE 11/09/83 DEPTH 40 M

I	P	I	P	I	P	I	P
275	.20	327	.14	303	.20	183	.44
223	.32	227	.32	128	.65	155	.60
151	.61	88	.69	108	.67	57	.65
77	.73	40	.78	53	.77	33	.72
37	.72	23	.56	26	.65	16	.71
18	.62	14	.44	12	.52	9	.35
10	.33	6	.22	7	.22	5	.15
5	.17	3	.09	4	.09	3	.05
2	.05	2	.03	2	.03	1	.02
1	.02	.8	.01	.9	.02	.7	.01

PARAMETER VALUES

PS : 1.27 (1.14, 1.40)

ALPHA : .045 (.042, .048)

BETA : .0074 (.0058, .0090)

FRACTION : >1 MICRON

SAMPLE TEMP 1.2 C

INCUBATION TEMP 2.5 C

CHLOROPHYLL	9.69	PHOSPHATE	.53
CARBON	-	NITRATE	2.49
NITROGEN	-	SILICATE	.71
		ATP	.49

EASTERN ARCTIC 1983

LAT 67 43.6'N LONG 57 02.9'W DATE 11/08/83 DEPTH 40 M

I	P	I	P	I	P	I	P
275	.06	327	.06	303	.04	183	.06
128	.10	151	.11	88	.10	104	.11
108	.10	57	.10	77	.10	40	.10
53	.12	33	.12	37	.13	23	.13
16	.11	18	.12	14	.10	12	.09
9	.12	10	.07	6	.07	7	.07
5	.07	5	.08	3	.08	4	.01
3	.03	2	.04	2	.03	1	.02
.8	.01	.9	.04	.7	.03		

PARAMETER VALUES

PS : .13 (.12, .14)

ALPHA : .017 (.015, .019)

BETA : .0014 (.0003, .0005)

FRACTION : <1 MICRON

SAMPLE TEMP 1.2 C

INCUBATION TEMP 2.5 C

CHLOROPHYLL	.52	PHOSPHATE	.53
CARBON	530.	NITRATE	2.49
NITROGEN	60.	SILICATE	.71
		ATP	.09

EASTERN ARCTIC 1983

LAT 71 14.6'N LONG 57 31.9'W DATE 12/08/83 DEPTH 35 M

I	P	I	P	I	P	I	P
335	.47	383	.60	343	.72	251	.59
167	.85	187	.75	167	.88	124	.89
74	.86	95	.90	58	.89	57	.89
41	.89	40	.85	30	.73	28	.88
21	.70	14	.81	15	.68	10	.78
11	.63	7	.58	7	.57	5	.39
5	.38	3	.31	3	.32	2	.20
3	.23	2	.16	2	.14	1	.09
1	.11	.7	.13	.7	.06	.5	.03

PARAMETER VALUES

PS : .93 (.90, .96)

ALPHA : .111 (.103, .119)

BETA : .0011 (.0008, .0013)

FRACTION : WHOLE

SAMPLE TEMP .1 C

INCUBATION TEMP 2.0 C

CHLOROPHYLL : .81

CARBON : 265.

NITROGEN : 12.

PHOSPHATE : .55

NITRATE : 2.14

SILICATE : 2.63

ATP : .10

EASTERN ARCTIC 1983

LAT 71 14.6'N LONG 57 31.9'W DATE 12/08/83 DEPTH 35 M

I	P	I	P	I	P	I	P
311	.38	343	.40	271	.50	179	.67
223	.65	179	.69	140	.75	155	.78
88	.85	89	.81	61	.82	80	.86
62	.83	40	.77	57	.85	31	.82
32	.85	23	.81	18	.79	18	.71
13	.69	12	.66	9	.56	9	.57
6	.43	6	.42	4	.32	4	.28
3	.21	3	.20	2	.13	2	.18
1	.10	1	.10	1	.07	.8	.07
.8	.04	.6	.04	.5	.03		

PARAMETER VALUES

PS : .98 (.96, 1.00)

ALPHA : .091 (.087, .094)

BETA : .0022 (.0020, .0024)

FRACTION : >1 MICRON

SAMPLE TEMP .1 C

INCUBATION TEMP 2.0 C

CHLOROPHYLL :	.35	PHOSPHATE :	.75
CARBON :	-	NITRATE :	2.14
NITROGEN :	-	SILICATE :	2.63
		ATP :	.18

EASTERN ARCTIC 1983

LAT 71 14.6'N LONG 57 31.9'W DATE 12/08/83 DEPTH 35 M

I	P	I	P	I	P	I	P
311	.35	343	.41	271	.37	179	.61
223	.52	179	.52	128	.66	106	.80
61	.72	80	.72	62	.82	40	.71
57	.88	31	.85	32	.82	18	.75
18	.74	13	.69	12	.68	9	.56
9	.58	6	.48	6	.53	4	.35
4	.39	3	.27	3	.24	2	.22
2	.25	1	.14	1	.14	1	.10
.8	.11	.8	.09	.6	.08	.5	.08

PARAMETER VALUES

PS : .91 (.88, .94)

ALPHA : .115 (.109, .121)

BETA : .0024 (.0021, .0027)

FRACTION : <1 MICRON

SAMPLE TEMP .1 C

INCUBATION TEMP 2.0 C

CHLOROPHYLL : .37

CARBON : 172.

NITROGEN : 23.

PHOSPHATE : .75

NITRATE : 2.14

SILICATE : 2.63

ATP : .05

EASTERN ARCTIC 1983

LAT 74 07.6'N LONG 63 01.2'W DATE 13/08/83 DEPTH 25 M

I	P	I	P	I	P	I	P
351	.95	367	.66	279	.98	259	1.12
191	1.17	144	1.04	136	1.17	148	1.20
91	1.03	80	1.06	61	1.08	48	1.07
43	1.05	25	.89	13	.87	10	.90
10	.75	7	.58	6	.52	5	.44
5	.39	4	.28	3	.31	3	.21
3	.28	2	.32	2	.20	2	.09
2	.12	1	.08	1	.03	.8	.07

PARAMETER VALUES

PS : 1.16 (1.11, 1.21)

ALPHA : .111 (.102, .119)

BETA : .0007 (.0004, .0011)

FRACTION : WHOLE

SAMPLE TEMP -.9 C

INCUBATION TEMP -.5 C

CHLOROPHYLL : .62

CARBON : 151.

NITROGEN : -

PHOSPHATE : .63

NITRATE : 2.57

SILICATE : 3.42

ATP : .18

EASTERN ARCTIC 1983

LAT 74 07.6'N LONG 63 01.2'W DATE 13/08/83 DEPTH 25 M

I	P	I	P	I	P	I	P
275	.60	383	.40	331	.57	179	.74
259	.68	239	.72	120	.77	167	.93
175	.80	85	.85	118	.82	117	.88
59	.84	85	.87	40	.80	56	.80
38	.71	24	.72	25	.68	16	.55
16	.54	12	.50	7	.37	8	.37
5	.28	6	.27	4	.22	4	.20
3	.15	3	.14	2	.09	2	.09
2	.07	2	.08	1	.04	1	.04
.9	.02	1	.02	.6	.02		

PARAMETER VALUES

PS : 1.00 (.97, 1.03)

ALPHA : .052 (.049, .054)

BETA : .0017 (.0015, .0019)

FRACTION : >1 MICRON

SAMPLE TEMP -.9 C

INCUBATION TEMP -.5 C

CHLOROPHYLL : .33

CARBON : -

NITROGEN : -

PHOSPHATE : .78

NITRATE : 2.57

SILICATE : 3.42

ATP : .09

EASTERN ARCTIC 1983

LAT 74 07.6'N LONG 63 01.2'W DATE 13/08/83 DEPTH 25 M

I	P	I	P	I	P	I	P
383	.12	331	.15	179	.27	239	.22
175	.35	85	.39	118	.31	117	.38
59	.42	85	.42	78	.40	40	.43
38	.43	24	.45	25	.45	16	.44
16	.35	12	.34	12	.33	7	.27
8	.20	5	.24	6	.19	4	.17
4	.19	3	.12	3	.11	2	.10
2	.09	2	.07	1	.05	1	.09
.9	.04	1	.05	.6	.05		

PARAMETER VALUES

PS : .53 (.51, .55)

ALPHA : .049 (.046, .051)

BETA : .0019 (.0017, .0021)

FRACTION : <1 MICRON

SAMPLE TEMP -.9 C

INCUBATION TEMP -.5 C

CHLOROPHYLL : .21

CARBON : 89.

NITROGEN : -

PHOSPHATE : .78

NITRATE : 2.57

SILICATE : 3.42

ATP : .05

EASTERN ARCTIC 1983

LAT 75 07.7'N LONG 73 54.9'W DATE 14/09/83 DEPTH 31 M

I	P	I	P	I	P	I	P
367	.10	351	.09	271	.18	279	.24
267	.22	207	.44	197	.45	191	.43
136	.57	132	.63	128	.61	104	.74
82	.73	77	.70	70	.71	50	.76
47	.75	39	.73	33	.75	28	.71
25	.68	20	.65	19	.71	14	.61
14	.60	12	.59	11	.59	8	.44
8	.46	6	.35	6	.32	4	.25
4	.24	3	.18	3	.16	2	.13
2	.11	2	.09	1	.09	1	.07
1	.07	.8	.05				

PARAMETER VALUES

PS : 1.04 (.99, 1.08)

ALPHA : .071 (.067, .074)

BETA : .0051 (.0045, .0057)

FRACTION : WHOLE

SAMPLE TEMP -1.3 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL : 8.17

CARBON : 450.

NITROGEN : 47.

PHOSPHATE : 1.45

NITRATE : 10.77

SILICATE : 7.82

ATP : .39

EASTERN ARCTIC 1983

LAT 75 07.7'N LONG 73 54.9'W DATE 14/08/83 DEPTH 31 M

I	P	I	P	I	P	I	P
283	.15	339	.11	295	.12	171	.30
243	.20	199	.22	155	.49	159	.39
140	.40	102	.55	110	.53	100	.55
65	.61	73	.56	65	.57	44	.59
49	.56	34	.53	35	.63	25	.63
25	.61	18	.59	13	.57	14	.54
9	.46	9	.43	6	.31	5	.27
5	.24	4	.19	4	.19	3	.12
3	.13	2	.09	2	.09	2	.06
1	.06	1	.05	1	.05	.9	.03

PARAMETER VALUES

PS : .84 (.79, .88)

ALPHA : .064 (.060, .068)

BETA : .0044 (.0039, .0050)

FRACTION : >1 MICRON

SAMPLE TEMP -1.3 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL : 7.77

CARBON : -

NITROGEN : -

PHOSPHATE : 1.45

NITRATE : 10.90

SILICATE : 7.95

ATP : .32

EASTERN ARCTIC 1983

LAT 75 07.7'N LONG 73 54.9'W DATE 14/08/83 DEPTH 31 M

I	P	I	P	I	P	I	P
283	.08	339	.06	171	.14	243	.09
199	.08	140	.16	65	.21	65	.16
44	.19	49	.21	34	.15	35	.21
25	.17	18	.21	9	.18	9	.17
7	.21	6	.17	5	.17	5	.19
4	.17	4	.13	3	.14	3	.13
2	.09	2	.11	2	.08	1	.08
1	.08	1	.07	.9	.04		

PARAMETER VALUES

PS : .21 (.20, .22)

ALPHA : .071 (.065, .077)

BETA : .0007 (.0006, .0008)

FRACTION : <1 MICRON

SAMPLE TEMP -1.3 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL : .96

CARBON : 129.

NITROGEN : 20.

PHOSPHATE : 1.45

NITRATE : 10.90

SILICATE : 7.95

ATP : .06

EASTERN ARCTIC 1983

LAT 76 06.2'N LONG 82 25.0'W DATE 15/08/83 DEPTH 18 M

I	P	I	P	I	P	I	P
331	1.08	371	.89	295	1.50	283	1.51
271	1.55	183	1.80	211	1.71	159	1.95
132	1.95	144	2.01	112	1.93	92	1.85
100	1.87	77	1.89	56	2.06	45	2.01
30	1.83	28	1.72	23	1.50	21	1.37
17	1.33	15	1.02	10	.75	8	.66
7	.48	6	.49	5	.32	4	.32
4	.21	3	.22	3	.13	2	.15
2	.10	2	.09	1	.05	1	.06
1	.04	.9	.04	.7	.03		

PARAMETER VALUES

PS : 2.60 (2.48, 2.71)

ALPHA : .099 (.095, .104)

BETA : .0057 (.0049, .0066)

FRACTION : WHOLE

SAMPLE TEMP -.4 C

INCUBATION TEMP -.5 C

CHLOROPHYLL : 6.57

CARBON : 390.

NITROGEN : 78.

PHOSPHATE : 1.74

NITRATE : 3.82

SILICATE : 15.78

ATP : .54

EASTERN ARCTIC 1983

LAT 76 06.2'N LONG 82 25.0'W DATE 15/09/83 DEPTH 18 M

I	P	I	P	I	P	I	P
327	1.18	391	.99	327	1.15	255	1.54
295	1.45	231	1.29	179	1.57	171	1.40
136	1.48	140	1.45	124	1.40	85	1.53
73	1.55	53	1.62	54	1.55	37	1.38
36	1.41	27	1.18	25	1.20	19	.86
16	.78	11	.62	12	.63	9	.44
9	.44	7	.35	6	.31	4	.23
4	.21	3	.16	3	.15	2	.10
2	.09	2	.05	2	.06	1	.03
1	.04	.8	.03	.8	.04	.6	.02

PARAMETER VALUES

PS : 1.90 (1.82, 1.99)

ALPHA : .068 (.065, .072)

BETA : .0027 (.0022, .0032)

FRACTION : >1 MICRON

SAMPLE TEMP -.4 C

INCUBATION TEMP -.5 C

CHLOROPHYLL	6.73	PHOSPHATE	1.05
CARBON	-	NITRATE	3.92
NITROGEN	-	SILICATE	15.78
		ATP	.44

EASTERN ARCTIC 1983

LAT 76 06.2'N		LONG 82 25.0'W		DATE 15/08/83		DEPTH 18 M	
I	P	I	P	I	P	I	P
327	.09	391	.04	255	.04	295	.03
231	.06	179	.19	171	.17	85	.23
82	.22	53	.20	36	.20	27	.22
110	.13	124	.13	9	.09	7	.09
6	.09	3	.08	3	.05	2	.08
2	.06	2	.08	2	.07	1	.05
1	.07	.8	.05	.8	.03	.6	.07

PARAMETER VALUES

PS : .28 (.24, .32)

ALPHA : .022 (.018, .026)

BETA : .0013 (.0009, .0018)

FRACTION : <1 MICRON

SAMPLE TEMP	-.4 C	INCUBATION TEMP	-.5 C
CHLOROPHYLL	.36	PHOSPHATE	1.05
CARBON	73.	NITRATE	3.82
NITROGEN	12.	SILICATE	15.78
		ATP	.05

EASTERN ARCTIC 1983

LAT 76 25.0'N LONG 83 05.0'W DATE 17/08/83 DEPTH 22 M

I	P	I	P	I	P	I	P
339	.88	427	.61	319	.69	179	.77
175	1.08	112	1.05	104	.92	79	1.03
86	.95	81	.94	54	.95	53	1.11
41	.98	37	1.05	25	.90	24	.96
19	.97	17	.90	13	.79	14	.75
10	.59	10	.57	6	.44	7	.43
5	.29	5	.31	3	.21	3	.20
2	.16	2	.15	2	.09	1	.08
1	.05	.9	.05	1	.04	.7	.04
.5	.03						

PARAMETER VALUES

PS : 1.13
(1.09, 1.16)

ALPHA : .088
(.083, .093)

BETA : .0014
(.0011, .0016)

FRACTION : WHOLE

SAMPLE TEMP -.6 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL : 6.89

CARBON : 664.

NITROGEN : 82.

PHOSPHATE : 1.05

NITRATE : .12

SILICATE : 2.90

ATP : .80

EASTERN ARCTIC 1983

LAT 75 25.0'N LONG 83 05.0'W DATE 17/08/83 DEPTH 22 M

I	P	I	P	I	P	I	P
299	.94	367	.79	291	.92	231	1.05
271	.91	219	.96	183	.88	151	.97
104	1.03	120	1.00	106	.99	71	1.04
85	.95	72	.97	44	.94	34	.95
38	.94	22	.89	28	.88	19	.74
14	.63	14	.67	9	.46	9	.47
7	.33	6	.33	5	.22	4	.23
4	.15	3	.15	3	.10	2	.11
2	.07	1	.09	1	.05	1	.05
.9	.03	.6	.04	.5	.03		

PARAMETER VALUES

PS : 1.07 (1.04, 1.09)

ALPHA : .067 (.064, .070)

BETA : .0006 (.0005, .0008)

FRACTION : >1 MICRON

SAMPLE TEMP -.6 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL	7.77	PHOSPHATE	1.05
CARBON	-	NITRATE	.12
NITROGEN	-	SILICATE	2.90
		ATP	.75

EASTERN ARCTIC 1983

LAT 76 25.0'N LONG 83 05.0'W DATE 17/09/83 DEPTH 22 M

I	P	I	P	I	P	I	P
299	.08	367	.07	291	.11	271	.12
167	.23	183	.24	151	.25	104	.25
72	.23	56	.22	34	.19	38	.20
14	.12	14	.17	9	.16	7	.05
6	.09	5	.08	4	.03	4	.06
3	.04	3	.02	2	.03	2	.02
1	.03	.9	.01	.6	.01	.5	.01

PARAMETER VALUES

PS : .43 (.33, .52)

ALPHA : .010 (.009, .012)

BETA : .0018 (.0010, .0027)

FRACTION : <1 MICRON

SAMPLE TEMP -.6 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL : .72

CARBON : 118.

NITROGEN : -

PHOSPHATE : 1.05

NITRATE : .12

SILICATE : 2.90

ATP : .07

EASTERN ARCTIC 1983

LAT 76 00.0'N LONG 82 02.5'W DATE 19/08/83 DEPTH 5 M

I	P	I	P	I	P	I	P
327	1.11	367	1.01	323	1.24	243	1.27
155	1.24	163	1.39	151	1.38	110	1.22
116	1.30	98	1.33	70	1.19	82	1.16
72	1.26	54	1.20	46	1.27	37	1.13
24	1.21	25	1.11	17	1.03	12	.72
12	.65	9	.52	9	.45	6	.39
7	.31	4	.25	5	.19	3	.16
3	.12	2	.10	2	.08	2	.07
1	.05	1	.03	.8	.03	.9	.03
.6	.02						

PARAMETER VALUES

PS : 1.37 (1.32, 1.43)

ALPHA : .077 (.072, .082)

BETA : .0007 (.0004, .0010)

FRACTION : WHOLE

SAMPLE TEMP -.3 C

INCUBATION TEMP -.2 C

CHLOROPHYLL : 12.17

CARBON : 1004.

NITROGEN : 90.

PHOSPHATE : .85

NITRATE : .06

SILICATE : 2.20

ATP : .64

EASTERN ARCTIC 1983

LAT 75 00.0'N LONG 82 02.5'W DATE 19/08/83 DEPTH 5 M

I	P	I	P	I	P	I	P
263	1.23	327	1.05	279	1.15	183	1.28
199	1.17	183	1.20	151	1.22	144	1.25
98	1.27	110	1.20	90	1.21	66	1.25
80	1.17	66	1.11	54	1.20	33	1.16
34	1.11	24	1.07	22	1.08	17	.96
16	.85	12	.78	12	.68	9	.56
8	.51	6	.39	5	.35	5	.26
4	.22	3	.15	3	.15	2	.10
2	.10	2	.07	2	.06	1	.04
1	.04	.9	.03	.8	.03	.7	.02

PARAMETER VALUES

PS : 1.29 (1.25, 1.32)

ALPHA : .083 (.080, .087)

BETA : .0005 (.0003, .0007)

FRACTION : >1 MICRON

SAMPLE TEMP -.3 C

INCUBATION TEMP -.2 C

CHLOROPHYLL	:	12.17	PHOSPHATE	:	.66
CARBON	:	-	NITRATE	:	.06
NITROGEN	:	-	SILICATE	:	3.26
			ATP	:	.58

EASTERN ARCTIC 1983

LAT 76 00.0'N		LONG 82 02.5'W		DATE 19/08/83		DEPTH	5 M
I	P	I	P	I	P	I	P
263	.07	327	.07	183	.09	199	.08
128	.10	151	.10	90	.12	66	.12
24	.10	17	.07	16	.10	12	.07
9	.06	8	.07	6	.05	5	.05
5	.04	4	.03	3	.03	3	.02
2	.02	2	.01	2	.02	1	.01
1	.01	.9	.02	.8	.02	.7	.01

PARAMETER VALUES

PS : .13 (.13, .14)

ALPHA : .009 (.009, .010)

BETA : .0003 (.0002, .0004)

FRACTION : <1 MICRON

SAMPLE TEMP -.3 C

INCUBATION TEMP -.2 C

CHLOROPHYLL	1.24	PHOSPHATE	.85
CARBON	126.	NITRATE	.06
NITROGEN	3.	SILICATE	3.26
		ATP	.07

EASTERN ARCTIC 1983

LAT 76 05.9'N LONG 82 26.0'W DATE 21/08/83 DEPTH 30 M

I	P	I	P	I	P	I	P
307	.88	359	1.15	279	.98	219	1.43
263	1.31	179	1.22	191	1.60	100	1.41
108	1.55	64	1.30	72	1.28	60	1.45
50	1.18	42	1.41	28	1.19	22	1.29
20	1.30	15	1.16	13	1.03	10	.91
10	.58	8	.96	7	.56	6	.50
5	.35	4	.41	4	.25	3	.10
3	.16	2	.15	2	.12	2	.06
1	.04	1	.07				

PARAMETER VALUES

PS : 1.52 (1.43, 1.61)

ALPHA : .113 (.103, .124)

BETA : .0014 (.0008, .0019)

FRACTION : WHOLE

SAMPLE TEMP -1.0 C

INCUBATION TEMP -1.0 C

CHLOROPHYLL : .76

CARBON : 82.

NITROGEN : 17.

PHOSPHATE : 2.30

NITRATE : 14.17

SILICATE : 32.04

ATP : .10

EASTERN ARCTIC 1983

LAT 76 05.9'N LONG 82 26.0'W DATE 21/08/83 DEPTH 50 M

I	P	I	P	I	P	I	P
231	1.11	163	2.40	223	1.03	104	2.69
155	1.87	151	2.25	52	2.24	62	2.65
40	1.80	26	2.31	34	1.73	19	1.78
24	2.20	16	2.32	11	1.96	7	1.49
5	1.29	6	.72	4	.74	4	.55
3	.54	3	.35	2	.48	1	.23
1	.25	1	.17	.7	.24		

PARAMETER VALUES

PS : 2.66 (2.38, 2.95)

ALPHA : .233 (.196, .269)

BETA : .0062 (.0033, .0091)

FRACTION : WHOLE

SAMPLE TEMP -1.2 C

INCUBATION TEMP -1.0 C

CHLOROPHYLL : .22

CARBON : 71.

NITROGEN : 22.

PHOSPHATE : 2.22

NITRATE : 11.44

SILICATE : 23.62

ATP : .05

EASTERN ARCTIC 1983

LAT 76 04.8'N LONG 82 09.4'W DATE 22/08/83 DEPTH 12.5 M

I	P	I	P	I	P	I	P
330	1.36	383	.38	279	1.65	235	1.82
279	1.94	211	2.05	175	2.07	203	1.93
148	2.11	120	2.06	144	2.15	94	2.18
78	2.13	84	2.02	64	1.99	52	1.96
44	2.07	37	1.88	32	1.82	25	1.91
23	1.91	17	1.72	16	1.57	13	1.40
9	1.00	8	.89	7	.74	6	.57
5	.51	4	.44	3	.33	3	.27
3	.21	2	.17	2	.14	1	.12
1	.08	.9	.06	.8	.05	.6	.04
.4	.03						

PARAMETER VALUES

PS : 2.48 (2.37, 2.58)

ALPHA : .139 (.130, .148)

BETA : .0037 (.0030, .0044)

FRACTION : WHOLE

SAMPLE TEMP -.7 C

INCUBATION TEMP -.5 C

CHLOROPHYLL : 8.81

CARBON : 1365.

NITROGEN : 108.

PHOSPHATE : .99

NITRATE : .00

SILICATE : .83

ATP : .62

EASTERN ARCTIC 1983

LAT 76 04.8'N LONG 82 09.4'W DATE 22/08/83 DEPTH 12.5 M

I	P	I	P	I	P	I	P
255	1.41	339	1.04	311	1.23	155	1.61
223	1.36	207	1.39	112	1.53	159	1.49
148	1.42	68	1.42	108	1.41	108	1.47
50	1.50	68	1.38	78	1.40	36	1.46
32	1.37	26	1.23	22	1.33	18	1.30
15	1.18	13	1.08	9	.89	8	.94
6	.69	6	.72	4	.45	4	.44
3	.33	3	.34	2	.24	2	.19
2	.14	2	.16	1	.09	1	.09
.8	.05	.8	.07	.6	.03	.6	.04
.4	.03						

PARAMETER VALUES

PS : 1.56 (1.52, 1.60)

ALPHA : .136 (.129, .142)

BETA : .0011 (.0008, .0013)

FRACTION : >1 MICRON

SAMPLE TEMP -.7 C

INCUBATION TEMP -.5 C

CHLOROPHYLL : 9.77

CARBON : -

NITROGEN : -

PHOSPHATE : 1.04

NITRATE : .11

SILICATE : 1.01

ATP : .55

EASTERN ARCTIC 1983

LAT 76 04.8'N LONG 82 09.4'W DATE 22/08/83 DEPTH 12.5 M

I	P	I	P	I	P	I	P
339	.04	311	.09	155	.10	223	.09
207	.12	148	.13	68	.13	108	.13
78	.14	36	.18	26	.15	22	.17
18	.17	15	.16	11	.15	9	.14
8	.11	6	.10	6	.06	4	.07
4	.06	3	.05	3	.05	2	.04
2	.02	2	.03	1	.03	1	.03
.8	.00	.6	.02	.6	.01	.4	.01

PARAMETER VALUES

PS : .19 (.18, .20)

ALPHA : .021 (.019, .023)

BETA : .0006 (.0005, .0007)

FRACTION : <1 MICRON

SAMPLE TEMP -.7 C

INCUBATION TEMP -.5 C

CHLOROPHYLL	.57	PHOSPHATE	1.04
CARBON	113.	NITRATE	.11
NITROGEN	23.	SILICATE	1.01
		ATP	.06

EASTERN ARCTIC 1983

LAT 74 07.0'N LONG 81 54.0'W DATE 23/08/83 DEPTH 25 M

I	P	I	P	I	P	I	P
303	.59	391	.52	283	.88	215	1.17
263	1.19	144	1.26	183	1.17	106	1.22
132	1.16	84	1.30	70	1.31	92	1.32
60	1.31	52	1.29	33	1.25	26	1.23
23	1.22	18	1.05	12	.84	10	.82
8	.58	8	.62	6	.43	4	.35
3	.22	2	.24	3	.18	2	.14
2	.10	1	.10	1	.07	1	.04
.7	.03	.6	.00	.4	.03		

PARAMETER VALUES

PS : 1.59 (1.52, 1.66)

ALPHA : .098 (.091, .104)

BETA : .0034 (.0028, .0040)

FRACTION : WHOLE

SAMPLE TEMP 0.0 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL : 1.59

CARBON : 82.

NITROGEN : 27.

PHOSPHATE : -

NITRATE : -

SILICATE : -

ATP : .15

EASTERN ARCTIC 1983

LAT 74 07.0'N LONG 81 54.0'W DATE 23/08/83 DEPTH 25 M

I	P	I	P	I	P	I	P
231	.49	303	.26	295	.26	151	.65
207	.48	239	.45	102	.65	155	.63
159	.60	70	.64	90	.65	102	.58
50	.64	60	.62	68	.67	36	.62
46	.56	28	.61	29	.47	21	.39
16	.28	11	.31	7	.22	8	.22
4	.15	5	.14	3	.10	4	.10
2	.07	3	.07	2	.04	2	.04
1	.03	1	.02	.7	.01	.9	.02
.5	.01	.6	.01	.3	.01		

PARAMETER VALUES

PS : 1.01 (.92, 1.10)

ALPHA : .028 (.027, .030)

BETA : .0037 (.0029, .0045)

FRACTION : >1 MICRON

SAMPLE TEMP 0.0 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL	.97	PHOSPHATE	-
CARBON	-	NITRATE	-
NITROGEN	-	SILICATE	-
		ATP	.13

EASTERN ARCTIC 1983

LAT 74 07.0'N LONG 81 54.0'W DATE 23/08/83 DEPTH 25 M

I	P	I	P	I	P	I	P
303	.48	151	.95	207	.78	159	.88
90	1.01	102	.95	50	1.06	60	1.03
36	.97	28	.91	29	.97	21	.92
14	.87	16	.88	9	.96	11	.44
7	.90	8	.65	4	.38	5	.20
3	.34	4	.28	2	.19	2	.15
1	.01	.7	.02	.6	.03	.3	.02

PARAMETER VALUES

PS : 1.14 (1.06, 1.22)

ALPHA : .120 (.106, .133)

BETA : .0023 (.0015, .0031)

FRACTION : <1 MICRON

SAMPLE TEMP 0.0 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL	.07	PHOSPHATE	-
CARBON	58.	NITRATE	-
NITROGEN	21.	SILICATE	-
		ATP	.04

EASTERN ARCTIC 1983

LAT 76 12.5'N LONG 82 34.0'W DATE 27/08/83 DEPTH 9 M

I	P	I	P	I	P	I	P
307	1.11	327	.95	239	1.14	215	1.18
239	1.10	183	1.25	159	1.24	120	1.12
94	1.11	104	1.14	82	1.35	58	1.18
68	1.13	54	1.14	46	1.23	37	1.26
35	1.09	25	1.09	22	1.04	20	1.03
16	.85	14	.83	13	.74	10	.64
9	.53	7	.48	6	.37	6	.33
4	.25	4	.22	3	.17	2	.14
2	.12	2	.09	2	.07	1	.06
1	.06	1	.04	.8	.04	.7	.03
.5	.02						

PARAMETER VALUES

PS : 1.30 (1.26, 1.33)

ALPHA : .086 (.082, .090)

BETA : .0008 (.0006, .0011)

FRACTION : WHOLE

SAMPLE TEMP -.7 C

INCUBATION TEMP 1.0 C

CHLOROPHYLL : 5.13

CARBON : 626.

NITROGEN : 54.

PHOSPHATE : .53

NITRATE : .00

SILICATE : 1.74

ATP : .36

EASTERN ARCTIC 1983

LAT 76 12.5'N LONG 82 34.0'W DATE 27/09/83 DEPTH 9 M

I	P	I	P	I	P	I	P
231	.83	295	.64	287	.69	167	.83
215	.87	167	.81	106	.89	70	.97
90	.90	68	.86	44	.90	60	.89
60	.85	29	.87	24	.84	24	.84
16	.78	18	.75	11	.65	13	.57
9	.48	9	.42	6	.32	7	.27
5	.24	5	.19	3	.17	4	.13
2	.10	2	.08	2	.07	2	.05
1	.05	1	.03	.8	.02	.9	.02
.5	.02	.6	.01	.4	.01		

PARAMETER VALUES

PS : 1.02 (.98, 1.06)

ALPHA : .067 (.064, .071)

BETA : .0013 (.0010, .0016)

FRACTION : >1 MICRON

SAMPLE TEMP -.7 C

INCUBATION TEMP 1.0 C

CHLOROPHYLL	5.61	PHOSPHATE	.53
CARBON	-	NITRATE	.00
NITROGEN	-	SILICATE	1.74
		ATP	.22

EASTERN ARCTIC 1983

LAT 76 12.5'N LONG 82 34.0'W DATE 27/08/83 DEPTH 9 M

I	P	I	P	I	P	I	P
295	.24	215	.57	167	.48	144	.54
70	.87	68	.96	44	1.04	60	1.11
29	.95	39	.93	24	1.02	11	.90
13	1.09	6	.65	7	.78	5	.51
5	.55	3	.44	4	.51	2	.34
2	.21	2	.20	2	.19	1	.18
.5	.03	.4	.09				

PARAMETER VALUES

PS : 1.26 (1.20, 1.32)

ALPHA : .158 (.147, .169)

BETA : .0062 (.0051, .0072)

FRACTION : <1 MICRON

SAMPLE TEMP	-.7 C	INCUBATION TEMP	1.0 C
CHLOROPHYLL	.09	PHOSPHATE	.53
CARBON	105.	NITRATE	.00
NITROGEN	15.	SILICATE	1.74
		ATP	.05

EASTERN ARCTIC 1983

LAT 76 11.3'N LONG 71 53.0'W DATE 31/08/83 DEPTH 35 M

I	P	I	P	I	P	I	P
195	.22	207	.33	155	.49	163	.50
120	.60	98	.59	100	.66	60	.76
48	.69	37	.75	44	.81	14	.84
11	.81	10	.84	8	.81	6	.71
6	.61	5	.49	4	.48	3	.34
3	.33	2	.27	2	.28	2	.24
1	.23	1	.20	1	.13	.8	.10
.8	.16	.5	.10	.5	.05	.4	.09
.4	.06	.3	.04				

PARAMETER VALUES

PS : 1.01 (.96, 1.05)

ALPHA : .165 (.156, .175)

BETA : .0053 (.0045, .0060)

FRACTION : WHOLE

SAMPLE TEMP -1.4 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL : 3.59

CARBON : 208.

NITROGEN : 30.

PHOSPHATE : .90

NITRATE : 3.58

SILICATE : 4.52

ATP : .11

EASTERN ARCTIC 1983

LAT 76 11.3'N LONG 71 53.0'W DATE 31/08/83 DEPTH 35 M

I	P	I	P	I	P	I	P
151	.28	203	.13	171	.17	88	.43
128	.31	118	.30	60	.46	88	.42
96	.41	42	.48	54	.45	56	.43
28	.47	34	.49	20	.44	23	.44
14	.44	16	.44	10	.44	13	.46
8	.33	5	.32	6	.31	4	.25
4	.25	3	.20	3	.18	2	.16
2	.11	1	.11	1	.10	.9	.06
.9	.07	.7	.03	.7	.04	.5	.04
.5	.04	.3	.02	.3	.02	.2	.01

PARAMETER VALUES

PS : .58 (.56, .60)

ALPHA : .078 (.074, .082)

BETA : .0031 (.0027, .0035)

FRACTION : >1 MICRON

SAMPLE TEMP -1.4 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL	1.90	PHOSPHATE	.90
CARBON	-	NITRATE	3.58
NITROGEN	-	SILICATE	4.52
		ATP	.07

EASTERN ARCTIC 1983

LAT 76 11.3'N LONG 71 53.0'W DATE 31/08/83 DEPTH 35 M

I	P	I	P	I	P	I	P
151	.10	203	.03	171	.03	88	.21
128	.13	118	.08	60	.22	98	.21
42	.28	54	.24	28	.31	34	.24
20	.28	23	.26	14	.25	16	.30
10	.19	13	.28	8	.30	5	.21
6	.27	4	.19	4	.18	3	.19
3	.18	2	.12	2	.13	1	.08
1	.08	.7	.06	.7	.04	.5	.06
.3	.02	.3	.01				

PARAMETER VALUES

PS : .34 (.32, .36)

ALPHA : .077 (.069, .084)

BETA : .0028 (.0023, .0033)

FRACTION : <1 MICRON

SAMPLE TEMP -1.4 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL : 1.05

CARBON : 303.

NITROGEN : 44.

PHOSPHATE : .90

NITRATE : 3.58

SILICATE : 4.52

ATP : .08

EASTERN ARCTIC 1983

LAT 74 45.0'N LONG 70 48.0'W DATE 03/09/83 DEPTH 2 M

I	P	I	P	I	P	I	P
363	4.83	227	5.60	279	5.77	155	5.35
179	5.19	140	4.93	104	4.37	88	3.94
78	4.97	60	4.60	37	3.28	37	3.14
25	3.69	20	2.98	12	1.93	11	1.67
9	1.31	8	1.01	7	.57	6	.59
5	.80	4	.64	4	.49	3	.53
2	.57	2	.42	2	.43	2	.24
1	.34	1	.21	.9	.30		

PARAMETER VALUES

PS : 5.13 (4.77, 5.49)

ALPHA : .171 (.156, .185)

BETA : .0010 (-.0016, .0016)

FRACTION : WHOLE

SAMPLE TEMP 1.5 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL : .17

CARBON : 185.

NITROGEN : 19.

PHOSPHATE : .53

NITRATE : .39

SILICATE : 1.94

ATP : .07

EASTERN ARCTIC 1983

LAT 74 45.0'N LONG 70 48.0'W DATE 03/09/83 DEPTH 15 M

I	P	I	P	I	P	I	P
303	.48	128	.63	187	.54	203	.68
124	.57	128	.59	62	.60	84	.59
82	.73	42	.66	52	.67	56	.63
30	.53	37	.70	26	.65	15	.59
18	.48	11	.41	12	.40	9	.30
8	.26	6	.19	6	.19	4	.14
3	.12	3	.09	2	.05	2	.04
2	.05	2	.03	1	.04	1	.02
1	.03	.8	.02				

PARAMETER VALUES

PS :	ALPHA :	BETA :
.73	.048	.0009
(.69, .77)	(.044, .051)	(.0006, .0012)

FRACTION : WHOLE

SAMPLE TEMP	1.1 C	INCUBATION TEMP	0.0 C
CHLOROPHYLL :	2.76	PHOSPHATE :	.72
CARBON :	456.	NITRATE :	.41
NITROGEN :	42.	SILICATE :	.60
		ATP :	.19

EASTERN ARCTIC 1983

LAT 73 24.0'N LONG 69 23.0'W DATE 04/09/83 DEPTH 24 M

I	P	I	P	I	P	I	P
287	.30	387	.17	327	.26	175	.34
259	.23	215	.39	120	.39	163	.38
77	.44	89	.43	55	.44	38	.34
46	.42	28	.38	32	.38	21	.36
23	.33	16	.34	16	.34	12	.24
13	.30	9	.21	6	.12	7	.14
4	.08	5	.08	4	.04	3	.04
3	.03	2	.02	2	.01	2	.01
2	.00	2	.00	1	.00		

PARAMETER VALUES

PS : .53 (.50, .57)

ALPHA : .027 (.025, .029)

BETA : .0013 (.0010, .0015)

FRACTION : WHOLE

SAMPLE TEMP -1.3 C

INCUBATION TEMP .5 C

CHLOROPHYLL : 8.73

CARBON : 498.

NITROGEN : 29.

PHOSPHATE : .83

NITRATE : .41

SILICATE : .10

ATP : .60

EASTERN ARCTIC 1983

LAT 73 24.0'N		LONG 68 23.0'W		DATE 04/09/83		DEPTH 24 M	
I	P	I	P	I	P	I	P
307	.15	295	.17	167	.22	219	.18
227	.19	112	.24	140	.27	148	.29
74	.28	86	.27	98	.28	50	.28
59	.25	62	.26	38	.24	43	.27
27	.23	20	.19	20	.23	14	.16
14	.21	12	.18	10	.17	8	.11
7	.12	6	.09	5	.08	4	.05
4	.06	3	.03	3	.02	2	.02
2	.02	2	.01	2	.00	2	.00

PARAMETER VALUES

PS : .33 (.31, .35)

ALPHA : .017 (.016, .019)

BETA : .0008 (.0006, .0009)

FRACTION : >1 MICRON

SAMPLE TEMP -1.3 C

INCUBATION TEMP .5 C

CHLOROPHYLL : 10.01

CARBON : -

NITROGEN : -

PHOSPHATE : .83

NITRATE : .41

SILICATE : .10

ATP : .40

EASTERN ARCTIC 1983

LAT 73 24.0'N LONG 68 23.0'W DATE 04/09/83 DEPTH 24 M

I	P	I	P	I	P	I	P
255	.06	307	.02	295	.03	167	.11
219	.06	227	.10	140	.08	148	.09
74	.15	86	.13	98	.12	50	.16
59	.14	43	.12	29	.12	20	.12
20	.16	14	.11	14	.16	12	.10
10	.14	8	.08	7	.11	6	.13
5	.11	4	.03	3	.05	2	.05
2	.04	1	.02				

PARAMETER VALUES

PS : .17 (.16, .19)

ALPHA : .021 (.018, .024)

BETA : .0007 (.0005, .0009)

FRACTION : <1 MICRON

SAMPLE TEMP -1.3 C

INCUBATION TEMP .5 C

CHLOROPHYLL : .28

CARBON : 93.

NITROGEN : 19.

PHOSPHATE : .83

NITRATE : .41

SILICATE : .10

ATP : .04

EASTERN ARCTIC 1983

LAT 71 55.4'N LONG 71 13.9'W DATE 05/09/83 DEPTH 2 M

I	P	I	P	I	P	I	P
243	2.80	299	3.03	283	2.58	195	3.41
191	2.77	191	3.15	140	3.82	163	3.66
136	3.70	100	4.03	66	3.71	82	3.50
42	3.74	30	3.05	27	2.59	22	2.99
18	1.95	16	3.24	13	2.09	10	2.57
7	2.02	5	2.23	4	1.12	4	1.30
3	.80	3	.93	2	1.17	2	1.07
2	1.05	1	.11	1	.23		

PARAMETER VALUES

PS : 3.69 (3.41, 3.96)

ALPHA : .352 (.307, .397)

BETA : .0026 (.0008, .0044)

FRACTION : WHOLE

SAMPLE TEMP 2.5 C

INCUBATION TEMP 2.5 C

CHLOROPHYLL : .15

CARBON : 101.

NITROGEN : 14.

PHOSPHATE : .58

NITRATE : .39

SILICATE : 2.37

ATP : .08

EASTERN ARCTIC 1983

LAT 71 55.4'N LONG 71 13.9'W DATE 05/09/83 DEPTH 10 M

I	P	I	P	I	P	I	P
243	2.34	203	2.06	104	3.39	54	3.54
80	3.32	42	3.11	56	2.93	30	3.76
37	2.78	16	1.97	7	1.99	6	1.55
4	1.70	4	1.40	2	1.05	1	1.04
1	1.36						

PARAMETER VALUES

PS : 3.43 (3.12, 3.73)

ALPHA : .453 (.367, .538)

BETA : .0055 (.0021, .0088)

FRACTION : WHOLE

SAMPLE TEMP 2.5 C

INCUBATION TEMP 2.5 C

CHLOROPHYLL	.16	PHOSPHATE	.59
CARBON	99.	NITRATE	.38
NITROGEN	14.	SILICATE	2.39
		ATP	.07

EASTERN ARCTIC 1983

LAT 72 11.8'N LONG 65 42.0'W DATE 07/09/83 DEPTH 2 M

I	P	I	P	I	P	I	P
263	2.08	323	2.25	195	2.45	215	2.32
140	2.34	148	2.60	114	2.41	98	2.25
82	2.42	68	2.27	76	2.37	62	2.34
50	2.14	44	2.29	35	2.07	30	1.77
25	1.38	20	1.40	17	1.04	14	1.11
10	1.12	7	.94	7	.95	5	.68
5	.18	4	.13	4	.13	3	.21
3	.12	3	.20	2	.08	2	.15
2	.08	2	.08	2	.14		

PARAMETER VALUES

PS : 2.63 (2.48, 2.79)

ALPHA : .101 (.094, .109)

BETA : .0016 (.0006, .0025)

FRACTION : WHOLE

SAMPLE TEMP .7 C

INCUBATION TEMP 2.5 C

CHLOROPHYLL : .25

CARBON : 136.

NITROGEN : 15.

PHOSPHATE : .68

NITRATE : .48

SILICATE : 4.29

ATP : .15

EASTERN ARCTIC 1983

LAT 72 11.8'N LONG 65 42.0'W DATE 07/09/83 DEPTH 10 M

I	P	I	P	I	P	I	P
247	2.09	307	2.06	279	2.00	155	2.34
183	2.15	187	2.29	112	2.16	114	2.30
124	2.07	78	2.01	98	1.96	92	2.07
52	2.09	68	2.20	37	1.69	46	1.77
26	1.57	30	1.51	18	1.48	12	.91
14	1.23	8	.97	10	1.21	7	.50
5	.72	5	.62	4	.66	3	.29
3	.22	2	.33	2	.26	2	.08
2	.05	2	.05	2	.07		

PARAMETER VALUES

PS : 2.12 (2.02, 2.21)

ALPHA : .121 (.112, .130)

BETA : .0000 (-.0005, .0005)

FRACTION : WHOLE

SAMPLE TEMP .7 C

INCUBATION TEMP 2.5 C

CHLOROPHYLL : .39

CARBON : 182.

NITROGEN : 24.

PHOSPHATE : .58

NITRATE : .41

SILICATE : 3.65

ATP : .16

EASTERN ARCTIC 1983

LAT 70 27.5'N LONG 68 35.4'W DATE 08/09/83 DEPTH 25 M

I	P	I	P	I	P	I	P
287	1.06	327	.65	199	1.45	239	1.22
183	1.16	144	1.55	159	1.43	128	1.44
110	1.42	118	1.46	86	1.49	76	1.54
82	1.52	58	1.50	52	1.46	42	1.52
36	1.45	30	1.50	26	1.26	22	1.22
17	.93	14	.81	12	.51	11	.64
8	.44	7	.44	6	.29	6	.31
5	.18	4	.18	4	.13	3	.12
3	.08	3	.07	3	.05	2	.04
2	.02	2	.02	2	.01	2	.02
2	.04						

PARAMETER VALUES

PS : 2.15 (1.97, 2.32)

ALPHA : .070 (.066, .075)

BETA : .0059 (.0045, .0074)

FRACTION : WHOLE

SAMPLE TEMP -.7 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL : 3.28

CARBON : 241.

NITROGEN : 31.

PHOSPHATE : 1.07

NITRATE : .24

SILICATE : 3.10

ATP : .15

EASTERN ARCTIC 1983

LAT 70 27.5'N		LONG 68 35.4'W		DATE 08/09/83		DEPTH 25 M	
I	P	I	P	I	P	I	P
251	.44	323	.25	291	.68	167	.90
223	.72	203	.93	110	.99	140	1.00
80	.92	94	.91	102	.83	54	.85
66	.88	68	1.08	36	1.04	50	1.02
28	.97	34	1.06	19	.92	21	.79
12	.82	14	.74	10	.59	11	.50
7	.38	7	.34	5	.25	5	.19
4	.12	4	.12	3	.06	3	.05
3	.04	2	.02	2	.02	2	.01
2	.01						

PARAMETER VALUES

PS : 1.29 (1.17, 1.41)

ALPHA : .067 (.060, .074)

BETA : .0038 (.0027, .0049)

FRACTION : >1 MICRON

SAMPLE TEMP -.7 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL :	3.19	PHOSPHATE :	1.07
CARBON :	-	NITRATE :	.24
NITROGEN :	-	SILICATE :	3.10
		ATP :	.18

EASTERN ARCTIC 1983

LAT 70 27.5'N LONG 68 35.4'W DATE 08/09/83 DEPTH 25 M

I	P	I	P	I	P	I	P
251	.72	323	.64	291	.63	167	1.46
203	1.15	110	1.53	144	1.32	94	1.38
54	1.34	66	1.35	50	1.29	34	1.35
19	.82	21	.88	12	1.26	14	1.12
10	.64	11	.47	7	.64	7	.37
5	.40	5	.45	4	.33	3	.20
3	.37	3	.22	3	.32	2	.24
2	.23	2	.20	2	.14	2	.17

PARAMETER VALUES

PS : 1.37 (1.67, 2.06)

ALPHA : .086 (.078, .095)

BETA : .0055 (.0038, .0073)

FRACTION : <1 MICRON

SAMPLE TEMP	-.7 C	INCUBATION TEMP	0.0 C
CHLOROPHYLL :	.15	PHOSPHATE :	1.07
CARBON :	98.	NITRATE :	.24
NITROGEN :	12.	SILICATE :	3.10
		ATP :	.03

EASTERN ARCTIC 1983

LAT 72 03.6'N		LONG 68 18.4'W		DATE 09/09/83		DEPTH 2 M	
I	P	I	P	I	P	I	P
251	3.82	287	2.97	211	4.82	151	5.11
104	5.39	83	5.58	67	4.64	48	3.99
28	3.21	18	3.52	20	3.20	12	2.44
8	3.09	10	2.09	5	1.23	6	1.30
3	1.42	2	1.02	3	.70	2	.66
2	.79	1	.32	2	.32	.7	.13
.5	.25	.4	.13	.6	.20	.3	.11
.3	.15						

PARAMETER VALUES

PS : 5.85 (5.29, 6.42)

ALPHA : .275 (.246, .304)

BETA : .0092 (.0051, .0133)

FRACTION : WHOLE

SAMPLE TEMP 1.4 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL : .20

CARBON : 95.

NITROGEN : 17.

PHOSPHATE : .49

NITRATE : .29

SILICATE : 2.65

ATP : .08

EASTERN ARCTIC 1983

LAT 72 03.6'N		LONG 68 18.4'W		DATE 09/09/83		DEPTH 10 M	
I	P	I	P	I	P	I	P
219	1.87	279	1.40	255	1.76	151	2.13
104	2.00	112	2.27	104	2.05	69	2.18
73	2.43	43	2.17	47	2.34	45	1.98
30	2.36	32	1.97	21	2.13	23	1.85
15	1.59	10	1.34	10	1.34	7	1.10
4	.72	3	.72	2	.51	2	.50
2	.37	1	.30	1	.22	.9	.33
.7	.06	.4	.05				

PARAMETER VALUES

PS : 2.44 (2.35, 2.53)

ALPHA : .208 (.193, .222)

BETA : .0034 (.0026, .0042)

FRACTION : WHOLE

SAMPLE TEMP 1.4 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL	.32	PHOSPHATE	.46
CARBON	162.	NITRATE	.29
NITROGEN	22.	SILICATE	2.09
		ATP	.05

EASTERN ARCTIC 1983

LAT 72 03.6'N LONG 68 18.4'W DATE 09/09/83 DEPTH 29 M

I	P	I	P	I	P	I	P
331	.32	267	.71	203	.79	231	.74
140	1.24	132	1.00	91	1.18	96	1.09
61	1.40	63	1.36	55	1.47	41	1.50
34	1.53	27	1.20	26	1.41	18	1.16
18	1.41	13	1.06	12	1.24	9	.92
9	.94	6	.65	6	.62	5	.62
4	.41	3	.29	3	.23	2	.17
2	.12	2	.11	2	.06	1	.06
1	.02	.8	.02	.8	.04	.6	.03
.6	.02	.4	.01				

PARAMETER VALUES

PS : 1.84 (1.74, 1.94)

ALPHA : .131 (.123, .139)

BETA : .0077 (.0065, .0090)

FRACTION : WHOLE

SAMPLE TEMP -1.2 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL : 11.61

CARBON : 1160.

NITROGEN : 140.

PHOSPHATE : .71

NITRATE : .32

SILICATE : .69

ATP : .81

EASTERN ARCTIC 1983

LAT 72 03.6'N LONG 68 18.4'W DATE 10/09/83 DEPTH 28 M

I	P	I	P	I	P	I	P
331	.24	267	.48	203	.46	231	.55
187	.74	140	.71	155	.76	132	.80
91	.73	87	.77	61	.81	63	.73
55	.80	41	.71	27	.65	26	.63
18	.64	13	.59	12	.66	9	.56
9	.40	6	.41	6	.36	5	.26
4	.24	3	.17	3	.15	2	.10
2	.10	2	.05	2	.05	1	.03
1	.03	.8	.01	.8	.01		

PARAMETER VALUES

PS : .93 (.87, .99)

ALPHA : .068 (.062, .074)

BETA : .0022 (.0017, .0028)

FRACTION : WHOLE

SAMPLE TEMP -1.1 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL	6.41	PHOSPHATE	.66
CARBON	818.	NITRATE	.31
NITROGEN	84.	SILICATE	.68
		ATP	.83

EASTERN ARCTIC 1983

LAT 71 45.8'N LONG 74 32.0'W DATE 11/09/83 DEPTH 10 M

I	P	I	P	I	P	I	P
251	3.07	287	2.29	211	2.87	171	3.05
151	3.09	144	2.91	132	2.62	104	3.26
104	2.74	83	3.54	68	3.48	42	3.31
28	3.25	18	2.89	20	2.08	14	2.06
8	1.32	5	1.15	6	.83	4	.52
2	.65	3	.50	2	.24	2	.31
1	.11	2	.12	.7	.02	1	.11
.5	.15	.9	.02	.4	.06	.6	.10
.3	.03						

PARAMETER VALUES

PS : 3.74 (3.51, 3.98)

ALPHA : .217 (.199, .234)

BETA : .0053 (.0035, .0071)

FRACTION : WHOLE

SAMPLE TEMP 2.2 C

INCUBATION TEMP 2.5 C

CHLOROPHYLL	.41	PHOSPHATE	.55
CARBON	146.	NITRATE	.31
NITROGEN	18.	SILICATE	2.12
		ATP	-

EASTERN ARCTIC 1983

LAT 71 45.8'N LONG 74 32.0'W DATE 11/09/83 DEPTH 20 M

I	P	I	P	I	P	I	P
219	1.65	279	1.57	255	2.00	151	2.14
183	1.71	104	2.05	112	2.14	104	2.31
69	2.11	73	2.46	43	1.96	47	2.25
30	2.29	32	2.09	21	2.19	23	1.70
15	1.93	15	1.25	10	1.12	10	1.00
7	1.14	6	.83	5	.70	4	.75
3	.50	3	.43	2	.42	2	.52
2	.22	1	.17	.9	.14	.7	.12
.5	.08	.4	.07	.4	.08	.2	.03

PARAMETER VALUES

PS : 2.49 (2.37, 2.62)

ALPHA : .175 (.163, .188)

BETA : .0036 (.0026, .0046)

FRACTION : WHOLE

SAMPLE TEMP 2.3 C

INCUBATION TEMP 2.5 C

CHLOROPHYLL : .46

CARBON : 110.

NITROGEN : 15.

PHOSPHATE : .59

NITRATE : .31

SILICATE : 2.59

ATP : -

EASTERN ARCTIC 1983

LAT 71 45.8'N LONG 74 32.0'W DATE 11/09/83 DEPTH 37 M

I	P	I	P	I	P	I	P
263	.15	331	.13	267	.35	203	.37
231	.44	187	.75	140	.88	155	.68
132	.81	91	.89	96	.96	87	1.02
61	.97	41	.93	34	.88	27	.91
18	.88	13	.97	9	.72	9	.80
6	.61	6	.60	5	.40	4	.30
3	.36	3	.28	2	.19	2	.18
2	.13	2	.12	1	.10	1	.09
.8	.07	.8	.06	.6	.04	.6	.04

PARAMETER VALUES

PS : 1.31 (1.22, 1.41)

ALPHA : .114 (.104, .124)

BETA : .0061 (.0049, .0073)

FRACTION : WHOLE

SAMPLE TEMP -.1 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL : 5.85

CARBON : 309.

NITROGEN : 51.

PHOSPHATE : .73

NITRATE : .51

SILICATE : 2.28

ATP : -

EASTERN ARCTIC 1983

LAT 71 45.8'N LONG 74 32.0'W DATE 11/09/83 DEPTH 45 M

I	P	I	P	I	P	I	P
259	.36	311	.30	271	.31	179	.62
227	.60	187	.53	116	.68	159	.67
85	.67	53	.65	65	.67	57	.66
45	.69	30	.67	16	.70	20	.59
12	.64	13	.59	9	.56	4	.32
4	.38	3	.28	3	.23	2	.17
2	.15	1	.10	2	.13	1	.07
.7	.07	1	.05	.5	.04	.3	.03

PARAMETER VALUES

PS : .79 (.76, .83)

ALPHA : .102 (.094, .111)

BETA : .0018 (.0015, .0021)

FRACTION : WHOLE

SAMPLE TEMP -1.1 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL	1.53	PHOSPHATE	1.06
CARBON	166.	NITRATE	4.21
NITROGEN	29.	SILICATE	8.62
		ATP	-

EASTERN ARCTIC 1983

LAT 74 16.5'N LONG 73 39.5'W DATE 12/09/83 DEPTH 2 M

I	P	I	P	I	P	I	P
295	1.67	263	1.87	144	1.77	191	1.56
171	1.64	82	1.65	110	1.79	63	1.53
62	1.82	76	1.80	41	1.71	28	1.28
34	1.34	21	1.25	25	1.00	14	.83
16	.72	10	.59	11	.45	9	.30
5	.39	6	.17	4	.15	2	.18
3	.14	1	.13	1	.17	.7	.10
.6	.11	.3	.09	.3	.03		

PARAMETER VALUES

PS : 1.90 (1.76, 2.05)

ALPHA : .070 (.065, .076)

BETA : .0009 (0.0000, .0017)

FRACTION : WHOLE

SAMPLE TEMP 1.6 C

INCUBATION TEMP 2.0 C

CHLOROPHYLL	.23	PHOSPHATE	.44
CARBON	194.	NITRATE	.37
NITROGEN	39.	SILICATE	1.18
		ATP	-

EASTERN ARCTIC 1983

LAT 74 16.5'N LONG 73 39.5'W DATE 12/09/83 DEPTH 10 M

I	P	I	P	I	P	I	P
223	1.89	211	1.79	144	1.66	183	1.63
136	1.79	94	1.81	116	1.65	90	1.82
59	1.83	54	1.70	61	1.84	41	1.59
48	1.79	41	1.58	27	1.69	32	1.66
18	1.23	20	1.21	11	.96	12	.92
8	.94	9	.59	5	.47	6	.51
3	.42	4	.28	2	.25	2	.23
1	.20	.7	.14	.5	.14	.2	.16
.2	.16	.1	.10				

PARAMETER VALUES

PS : 1.82 (1.75, 1.90)

ALPHA : .115 (.108, .123)

BETA : .0003 (-.0002, .0009)

FRACTION : WHOLE

SAMPLE TEMP 1.6 C

INCUBATION TEMP 2.0 C

CHLOROPHYLL : .26

CARBON : 108.

NITROGEN : -

PHOSPHATE : .44

NITRATE : .31

SILICATE : .96

ATP : -

EASTERN ARCTIC 1983

LAT 74 16.5'N LONG 73 39.5'W DATE 12/09/83 DEPTH 39 M

I	P	I	P	I	P	I	P
327	.50	267	.69	203	.77	207	.77
179	.95	128	.97	148	1.14	124	1.14
89	1.05	99	1.02	87	1.06	65	1.20
59	1.19	51	1.16	44	1.12	31	1.12
28	1.12	13	.86	14	.96	9	.81
9	.90	7	.53	6	.58	5	.43
4	.40	3	.30	3	.31	2	.22
2	.20	2	.14	2	.18	1	.11
1	.11	.7	.06	.7	.08	.5	.07

PARAMETER VALUES

PS : 1.36 (1.32, 1.41)

ALPHA : .120 (.113, .126)

BETA : .0034 (.0030, .0039)

FRACTION : WHOLE

SAMPLE TEMP -1.3 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL	.78	PHOSPHATE	.92
CARBON	127.	NITRATE	6.18
NITROGEN	36.	SILICATE	8.67
		ATP	-

Units

P = mg $O_2 m^{-3} h^{-1} (mg\ Chl)^{-1}$

I = $W\ m^{-2}$

P_s = mg O_2 mg $Chl^{-1} h^{-1}$

α = mg $O_2 (mg\ Chl)^{-1} h^{-1} W^{-1} m^{-2}$

β = mg $O_2 (mg\ Chl)^{-1} h^{-1} W^{-1} m^{-2}$

Organic particulate concentrations are in mg m^{-3} and nutrients are in mg at m^{-3}. The 90% confidence interval for P_s, α and β are shown in the closed brackets below the estimates for each parameter.

Light Saturation Data - O_2

EASTERN ARCTIC 1983

LAT 75 07.7'N LONG 73 54.9'W DATE 14/08/83 DEPTH 31 M

I	P	I	P	I	P	I	P
299	2.57	267	2.68	227	4.19	223	4.93
151	3.65	116	4.44	88	4.90	76	4.86
72	4.43	56	4.95	40	4.16	37	4.45
29	4.23	28	4.53	21	3.16	20	3.70
14	2.38	13	3.13	10	1.94	9	2.39
7	2.02	2	1.81	2	1.35	1	.54
1	.61						

PARAMETER VALUES

PS :	ALPHA :	BETA :
5.47	.314	.0099
(4.99, 5.94)	(.277, .351)	(.0061, .0136)

SAMPLE TEMP	-1.3 C	INCUBATION TEMP	-.5 C
CHLOROPHYLL :	6.41	PHOSPHATE :	3.02
CARBON :	450.	NITRATE :	10.77
NITROGEN :	47.	SILICATE :	7.82
		ATP :	.39

EASTERN ARCTIC 1983

LAT 76 06.2'N LONG 82 25.0'W DATE 15/09/83 DEPTH 18 M

I	P	I	P	I	P	I	P
343	9.77	287	6.67	275	7.56	243	7.16
219	9.62	187	10.77	171	9.26	159	11.12
108	8.07	84	9.90	84	8.70	76	7.40
44	8.78	56	8.16	44	7.22	38	6.71
30	6.94	21	5.71	21	5.90	15	6.05
14	5.77	10	3.20	7	1.28	6	1.74
4	1.98	3	.29	2	.17	2	.85
2	1.19						

PARAMETER VALUES

PS : 9.70 (8.81, 10.58)

ALPHA : .410 (.358, .463)

BETA : .0051 (.0004, .0099)

SAMPLE TEMP -.4 C

INCUBATION TEMP -.7 C

CHLOROPHYLL : 7.05

CARBON : 390.

NITROGEN : 78.

PHOSPHATE : 1.73

NITRATE : 3.82

SILICATE : 15.77

ATP : .54

EASTERN ARCTIC 1983

LAT 76 25.0'N LONG 83 05.0'W DATE 17/09/83 DEPTH 22 M

I	P	I	P	I	P	I	P
395	.81	307	1.72	275	2.75	187	3.67
183	2.49	155	3.09	116	2.72	108	2.95
84	3.93	72	4.71	22	4.96	21	4.83
17	4.95	15	3.92	10	2.11	8	1.98
3	.42	3	.41	2	.45		

PARAMETER VALUES

PS : 5.07	ALPHA : .440	BETA : .0248
(5.11, 6.82)	(.367, .514)	(.0156, .0341)

SAMPLE TEMP	-.6 C	INCUBATION TEMP	-1.0 C
CHLOROPHYLL	: 8.09	PHOSPHATE	: 1.03
CARBON	: 664.	NITRATE	: .11
NITROGEN	: 82.	SILICATE	: 2.54
		ATP	: .80

EASTERN ARCTIC 1983

LAT 76 04.8'N LONG 82 09.4'W DATE 22/08/83 DEPTH 12.5 M

I	P	I	P	I	P	I	P
327	2.87	283	2.80	279	3.08	239	3.62
195	3.64	195	3.53	155	3.70	136	3.70
100	4.20	84	3.90	68	4.33	68	4.54
48	3.05	34	3.60	24	2.76	16	2.32
16	1.46	8	1.12	5	.31	4	.50
4	.08	1	.07				

PARAMETER VALUES

PS : 5.34 (4.79, 5.89)

ALPHA : .157 (.142, .173)

BETA : .0137 (.0070, .0144)

SAMPLE TEMP -.7 C

INCUBATION TEMP -.5 C

CHLOROPHYLL : 12.33

CARBON : 1365.

NITROGEN : 108.

PHOSPHATE : .99

NITRATE : .00

SILICATE : .83

ATP : .62

EASTERN ARCTIC 1983

LAT 76 12.5'N LONG 82 34.0'W DATE 27/08/83 DEPTH 9 M

I	P	I	P	I	P	I	P
247	.56	215	.07	203	.26	132	.44
96	1.59	92	1.59	84	2.55	68	1.90
68	2.37	48	2.41	48	2.99	33	2.88
24	3.05	18	2.74	17	1.84	12	1.53
12	1.65	8	1.60	4	1.32	3	.60
2	1.35	1	.88	1	.59	1	1.02

PARAMETER VALUES

PS : 7.74 (2.05, 13.44)

ALPHA : .238 (.203, .273)

BETA : .1255 (-.0189, .2699)

SAMPLE TEMP -.7 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL : 4.16

CARBON : 626.

NITROGEN : 54.

PHOSPHATE : .51

NITRATE : .00

SILICATE : 1.74

ATP : .36

EASTERN ARCTIC 1983

LAT 73 24.0'N LONG 68 23.0'W DATE 04/09/83 DEPTH 24 M

I	P	I	P	I	P	I	P
335	1.24	243	2.24	207	1.29	183	2.37
128	3.88	100	4.00	94	3.85	65	3.73
12	4.05	10	4.20	8	3.38	7	2.80
5	2.85	5	2.48	3	1.91	3	2.30
2	2.39	2	2.06	2	1.94	2	1.70
1	1.84						

PARAMETER VALUES

PS : 4.79
(4.28, 5.30)

ALPHA : .988
(.855,1.121)

BETA : .0167
(.0113, .0222)

SAMPLE TEMP -1.3 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL	: 4.16	PHOSPHATE	: .83
CARBON	: 498.	NITRATE	: .41
NITROGEN	: 29.	SILICATE	: .10
		ATP	: .60

EASTERN ARCTIC 1983

LAT 72 03.6'N LONG 68 18.4'W DATE 09/09/83 DEPTH 29 M

I	P	I	P	I	P	I	P
311	.25	271	.52	259	1.06	227	.66
159	2.09	136	2.14	116	2.32	85	2.18
74	2.14	65	2.37	57	2.42	53	2.39
45	1.93	35	2.03	20	2.06	16	2.09
13	1.67	12	1.62	9	1.56	8	1.44
6	1.62	4	1.12	4	.94	3	.78
2	.50	2	.93	2	.98	1	.02
1	.57	1	.31	1	.12	1	.37
1	.70						

PARAMETER VALUES

PS : 2.88 (2.64, 3.12)

ALPHA : .287 (.253, .321)

BETA : .0119 (.0088, .0149)

SAMPLE TEMP -1.2 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL	: 18.29	PHOSPHATE	: .71
CARBON	: 1160.	NITRATE	: .32
NITROGEN	: 140.	SILICATE	: .69
		ATP	: .81

EASTERN ARCTIC 1983

LAT 72 03.6'N LONG 68 18.4'W DATE 10/09/83 DEPTH 28 M

I	P	I	P	I	P	I	P
311	.59	271	2.32	259	1.69	227	2.40
159	2.97	136	3.18	116	3.86	95	2.95
85	3.61	57	3.08	53	3.25	45	3.04
35	3.08	25	3.53	20	3.55	14	2.42
13	2.82	12	1.93	9	2.12	8	2.70
6	1.82	6	1.08	4	.96	4	1.70
3	.94	2	.72	2	1.03	2	1.44
1	.93	1	.37	1	.95	1	.88

PARAMETER VALUES

PS : 3.94 (3.62, 4.27)

ALPHA : .387 (.338, .436)

BETA : .0102 (.0070, .0134)

SAMPLE TEMP -1.1 C

INCUBATION TEMP 0.0 C

CHLOROPHYLL	8.33	PHOSPHATE	.66
CARBON	818.	NITRATE	.32
NITROGEN	84.	SILICATE	.68
		ATP	.83

Units

Z = depth in meters

P = primary production in mg C $m^{-3}h^{-1}$

P_g = gross oxygen production in mg O_2 $m^{-3}h^{-1}$

P_n = net oxygen production in mg O_2 $m^{-3}h^{-1}$

P_r = oxygen respiration in mg O_2 $m^{-3}h^{-1}$

Organic particulates concentrations are in mg m^3 and inorganic nutrients are in mg at m^{-3}.

In Situ Profiles

EASTERN ARCTIC 1983

LAT 75 45.0'N LONG 80 29.0'W DATE 16/08/83 INCUB TIME 7.0 HRS

Z	P	PG	O2 PN	PR	NO3	SIO3	PO4	CHL	CARBON	NITROGEN	ATP
5	1.30	5.1	6.5	-1.4	.00	.51	.54	1.96	706	80	.20
10	1.32	6.1	-28.3	34.3	.08	.50	.58	2.18	345	46	.21
15	6.17	27.8	5.5	22.3	.09	1.18	.73	5.13	514	54	.57
20	5.73	27.1	-31.3	58.4	.32	1.79	.92	8.73	1010	93	.37
25	1.08	4.0	-32.0	35.9	5.34	9.52	1.21	5.29	278	49	.34
30	.32	6.0	-39.2	45.1	5.96	14.00	1.52	4.89	338	87	.24
40	.15	8.5	-17.6	26.1	9.05	20.93	1.63	1.62	168	35	.11
50	.04	.6	8.7	-8.1	10.27	24.12	1.78	1.11	107	24	.08
60	.01	3.6	-37.6	41.1	11.58	27.29	1.69	.62	87	38	.11
70	.03	5.5	-16.2	21.7	8.19	15.30	1.31	.27	234	42	.03
80	.15	7.9	-11.6	19.5	9.59	16.65	1.67	.25	70	23	.05
90	.00	10.8	-20.8	31.6	7.44	12.86	1.18	.17	54	29	.04
100	.06	4.2	-5.1	9.3	8.61	14.53	1.20	.16	143	57	.04

EASTERN ARCTIC 1983

LAT 76 03.5'N LONG 92 20.0'W DATE 18/08/83 INCUB TIME 7.5 HRS

Z	P	PG	O2 PN	PR	NO3	SIO3	PO4	CHL	CARBON	NITROGEN	ATP
5	11.38	50.0	37.9	12.2	.13	2.50	1.17	11.13	995	107	.80
10	14.01	64.4	43.4	21.0	.00	2.72	.97	21.95	1017	29	1.49
15	1.97	6.3	-.4	6.7	2.29	8.86	1.08	15.38	1021	104	.50
20	.29	4.4	-5.2	9.6	7.42	19.11	1.41	3.74	247	-	.18
25	.06	-.7	-2.8	2.1	10.62	26.81	2.01	.81	133	23	.07
30	.05	-.9	-1.2	.4	10.67	25.13	1.56	.46	81	-	.09
40	.09	-.7	-2.0	1.4	11.42	27.98	1.65	.32	112	-	.04
50	.04	-2.0	-3.9	1.9	12.93	28.46	1.87	.28	180	10	.05
60	.01	.4	-3.9	4.3	13.59	29.20	1.93	.22	58	-	.05
70	.01	1.0	-3.0	3.9	11.29	25.43	1.70	.20	79	-	.06
80	.02	-2.0	-5.5	3.5	13.27	29.22	1.65	.19	64	-	.06
90	.03	5.3	-2.5	7.8	11.97	26.08	1.80	.15	164	-	.05
100	.03	5.2	-8.2	13.4	11.35	24.61	1.61	.14	71	-	.05

EASTERN ARCTIC 1983

LAT 75 06.5'N LONG 82 22.0'W DATE 20/08/83 INCUB TIME 23.5 HRS

Z	P	PG	O2 PN	PR	NO3	SIO3	PO4	CHL	CARBON	NITROGEN	ATP
5	1.97	9.0	1.4	7.7	.04	2.22	.73	2.61	441	52	.56
10	11.11	46.5	27.2	19.4	.11	1.24	.77	16.96	1170	130	1.06
15	6.87	28.8	25.7	3.1	4.66	7.78	.95	26.93	970	173	1.40
20	.49	2.7	-1.9	4.6	7.78	17.92	1.44	8.33	472	85	.65
25	.04	.0	-3.6	3.6	7.84	19.55	1.31	4.20	195	29	.20
30	.05	4.9	-1.0	5.8	8.39	20.20	1.31	1.72	125	-	.14
40	.02	1.6	-8.1	9.7	11.59	27.28	1.77	.64	99	-	.09
50	.01	4.0	.5	3.6	11.70	26.43	1.65	.27	69	18	.06
60	.05	2.9	-2.2	5.0	11.55	25.41	1.79	.19	72	26	.06
70	.03	3.9	-2.1	6.0	12.12	26.32	1.49	.19	49	30	.07
80	.04	3.9	-2.1	6.1	13.44	27.94	2.16	.14	67	-	.06
90	.02	8.3	-5.2	13.5	11.65	24.62	1.61	.17	60	-	.05
100	-	6.5	-4.6	11.2	13.11	26.10	3.72	.20	55	32	.06

EASTERN ARCTIC 1983

LAT 74 21.1'N LONG 81 49.8'W DATE 24/08/83 INCUB TIME 6.0 HRS

Z	P	PG	O2 PN	PR	NO3	SIO3	PO4	CHL	CARBON	NITROGEN	ATP
5	.45	-	-	-	.09	.92	.79	.53	243	23	.11
10	.54	-	-	-	.08	.53	.70	.47	171	-	.10
15	.48	-	-	-	.07	.58	.60	.40	146	-	.07
20	.43	-	-	-	.09	.79	.65	.43	106	17	.08
25	.69	-	-	-	.12	.59	.70	.47	116	41	.13
30	3.69	-	-	-	.35	1.60	1.32	5.03	797	116	.34
40	.13	-	-	-	8.53	16.57	1.58	1.53	86	-	.09
50	.09	-	-	-	10.51	20.14	1.67	.64	102	28	.07
60	.29	-	-	-	8.54	12.68	1.92	4.24	256	46	-
70	.05	-	-	-	10.51	18.84	1.55	.56	100	34	.06
80	.01	-	-	-	11.64	22.16	1.75	.17	51	12	.03
90	.04	-	-	-	8.50	12.83	1.76	.84	77	14	.08
100	.08	-	-	-	10.65	13.50	1.81	2.24	115	14	.12

EASTERN ARCTIC 1983

LAT 73 52.9'N LONG 41 46.5'W DATE 25/08/83 INCUB TIME 6.0 HRS

Z	P	PG	O2 PN	PR	NO3	SIO3	PO4	CHL	CARBON	NITROGEN	ATP
5	3.78	16.3	9.4	7.0	.10	5.46	.70	1.84	222	32	.23
10	4.08	23.1	10.1	13.0	.10	5.50	.90	1.51	232	42	.31
15	3.19	15.9	6.4	9.5	.10	5.90	1.10	1.15	206	31	.19
20	1.42	6.3	1.9	4.4	7.55	22.43	2.01	.85	125	-	.11
25	.75	5.4	5.0	.4	8.65	24.62	2.10	.57	101	29	.11
30	.25	.3	-3.7	3.9	9.29	24.90	1.77	.32	90	-	.07
40	.06	2.8	2.3	.6	12.96	33.90	2.66	.26	83	20	.05
50	.06	6.1	12.1	-6.0	13.51	31.98	2.23	.13	56	24	.04
60	.01	-8.1	-3.6	-4.5	11.14	26.64	2.42	.12	240	61	.04
70	.03	.1	.3	-.3	15.42	34.55	2.22	.06	134	31	.04
80	.00	4.8	.3	4.6	17.43	38.19	2.54	.05	108	39	.04
90	.00	-3.1	.7	-3.8	19.21	38.70	2.79	.04	82	20	.04
100	.01	-11.7	-10.8	-.9	22.01	46.66	3.22	.09	264	44	.04

EASTERN ARCTIC 1983

LAT 74 22.0'N LONG 82 32.5'W DATE 26/08/83 INCUB TIME 6.5 HRS

Z	P	PG	O2 PN	PR	NO3	SIO3	PO4	CHL	CARBON	NITROGEN	ATP
5	.63	3.2	12.4	-9.2	.21	1.68	.71	.61	169	-	.12
10	.83	3.3	1.8	1.5	.12	.50	.47	.67	251	50	.15
15	.85	3.3	1.4	2.4	.12	.13	.58	.89	208	25	.10
20	.98	4.2	1.8	2.5	.00	.56	.57	.97	195	21	.09
25	1.38	5.1	1.7	3.4	.11	.65	.64	2.08	229	-	.16
30	1.45	7.2	.1	7.0	.76	2.67	.87	3.43	206	29	.18
40	.71	3.3	1.8	1.5	3.74	7.91	1.03	4.17	246	42	.27
50	.06	-.6	4.3	-4.9	4.82	8.28	1.22	.82	148	29	.10
60	.00	1.4	1.3	.1	11.39	22.73	1.87	.32	89	13	.15
70	.15	4.2	4.6	-.4	14.67	29.95	2.31	.19	98	13	.10
80	.09	3.3	-.3	3.6	14.23	29.34	2.15	.20	59	-	.04
90	.10	1.5	-6.1	7.6	13.82	26.81	1.56	.13	94	17	.05
100	.14	3.8	-6.3	10.1	14.02	27.02	1.58	.12	62	-	.04

EASTERN ARCTIC 1983

LAT 76 14.0'N LONG 82 45.0'W DATE 28/08/83 INCUB TIME 6.5 HRS

Z	P	PG	O2 PN	PR	NO3	SIO3	PO4	CHL	CARBON	NITROGEN	ATP
5	.78	3.9	-2.4	6.3	.02	1.37	.57	.98	322	24	.14
10	.54	3.4	3.8	-.5	.00	.66	.77	.98	274	24	.17
15	1.33	6.7	-.2	6.9	.04	.93	1.05	3.03	444	40	.19
20	3.26	9.8	6.3	3.5	.09	1.69	1.38	6.41	488	50	.27
25	.85	5.1	-1.6	6.7	9.51	15.48	1.80	6.25	306	42	.28
30	.12	.3	-2.5	2.8	13.70	29.19	2.13	2.12	170	20	.19
40	.01	.3	-3.6	4.4	14.43	31.06	2.26	.86	131	14	.08
50	.06	1.0	-4.8	5.9	16.08	34.23	2.45	.54	76	-	.08
60	.02	1.0	-2.7	3.7	16.25	34.37	2.30	.37	77	11	.08
70	.09	9.4	9.3	.0	17.33	36.28	2.24	.34	43	-	.05
80	.00	-2.2	-.6	-1.6	17.07	34.96	2.17	.23	64	-	.04
90	.08	1.8	-1.6	3.4	17.24	34.73	2.04	.22	56	-	.05
100	.03	2.8	2.9	-.1	18.50	35.71	2.34	.28	70	-	.05

EASTERN ARCTIC 1983

LAT 76 15.8'N LONG 82 36.5'W DATE 29/08/83 INCUB TIME 21.8 HRS

Z	P	PG	O2 PN	PR	NO3	SIO3	PO4	CHL	CARBON	NITROGEN	ATP
5	.47	4.0	-.2	4.2	.06	1.31	.60	2.36	588	36	.21
10	.20	2.0	-1.1	3.1	.03	.79	.58	.96	302	30	.17
15	.88	5.3	1.4	3.9	.01	.90	.97	4.66	484	48	.36
20	.97	5.5	2.6	3.0	.45	2.51	1.51	8.65	656	90	.42
25	.11	1.8	-.4	2.2	8.62	15.06	1.75	4.43	346	48	.39
30	.03	.7	.7	.0	13.02	28.06	2.32	1.96	216	18	.15
40	.02	.6	.3	.7	12.65	29.48	2.40	1.09	208	26	.09
50	.01	.8	.2	.6	15.38	34.00	2.32	.52	70	12	.05
60	.02	2.3	1.4	.9	16.16	38.30	2.25	.31	70	12	.05
70	.01	.9	-.8	1.7	16.85	35.91	2.05	.27	51	-	.04
80	.03	2.4	.6	1.8	19.05	39.32	2.45	.21	62	-	.03
90	.02	3.4	.6	2.8	18.89	38.98	2.56	.25	52	-	.04
100	.02	2.9	-.5	3.4	15.82	32.47	1.90	.21	56	10	.03

EASTERN ARCTIC 1983

LAT 72 11.8'N LONG 55 42.0'W DATE 06/09/83 INCUB TIME 25.9 HRS

Z	P	PG	O2 PN	PR	NO3	SIO3	PO4	CHL	CARBON	NITROGEN	ATP
5	.19	.9	.4	.6	.37	5.58	.68	.16	100	16	.08
10	.19	.9	.3	.6	.33	5.70	.72	.17	102	14	.07
15	.75	3.6	1.2	2.5	.33	2.55	.51	.66	256	34	.23
20	1.27	7.8	4.3	3.4	.33	4.40	.56	3.19	337	49	.44
25	.86	6.4	2.9	3.5	3.12	10.51	.83	3.95	255	44	.25
30	.08	2.5	-.1	2.6	5.30	11.82	1.00	.76	139	20	.07
40	.03	2.2	.7	1.6	7.58	13.55	1.16	.29	107	12	.07
50	.01	2.9	.6	2.2	9.09	14.50	1.17	.13	75	14	.04
60	.01	5.1	.5	4.6	9.09	13.52	1.31	.26	85	18	.03
70	.00	2.9	.7	2.1	9.48	13.31	1.25	.11	98	14	.03
80	.01	5.9	.4	5.4	8.94	11.11	1.20	.11	91	15	.03
90	.00	4.7	.2	4.5	8.84	10.15	1.16	.05	137	13	.02
100	.00	11.1	.1	11.1	10.67	13.04	1.31	.03	85	12	.03

EASTERN ARCTIC 1983

LAT 75 04.5'N LONG 82 12.0'W DATE 13/09/83 INCUB TIME 23.7 HRS

Z	P	PG	O2 PN	PR	NO3	SIO3	PO4	CHL	CARBON	NITROGEN	ATP
5	.12	6.2	4.9	1.2	2.47	4.61	.89	3.92	269	52	.14
10	1.16	4.5	4.1	.5	2.00	4.36	.83	3.90	256	50	.19
15	.52	1.6	1.5	.0	2.94	5.13	.91	3.46	198	32	.16
20	1.90	.7	-1.0	1.7	3.69	6.12	1.02	1.53	162	26	.11
25	.02	1.7	-.4	2.1	7.18	11.91	1.33	.24	82	12	.05
30	.03	1.2	.0	1.3	8.18	14.43	1.36	.24	75	-	.06
40	.03	1.1	3.6	-2.5	9.65	19.92	1.45	.17	60	-	.06
50	.01	-.1	-.2	.1	9.97	20.12	1.47	.13	100	19	.07
60	.00	3.8	3.1	.7	10.58	21.34	1.47	.12	70	15	.07
70	.02	1.4	1.3	.1	10.75	21.62	1.42	.12	54	31	.04
80	.02	4.9	2.1	2.8	10.94	21.91	1.47	.11	27	-	.04
90	.02	2.7	1.0	1.6	11.22	21.96	1.47	.12	148	-	.03
100	.01	1.2	-.8	2.0	11.50	22.27	1.49	.10	54	20	.04

EASTERN ARCTIC 1983

LAT 76 04.5'N LONG 82 12.0'W DATE 14/09/83 INCUB TIME 23.5 HRS

Z	P	PG	O2 PN	PR	NO3	SIO3	PO4	CHL	CARBON	NITROGEN	ATP
5	2.30	8.5	7.6	.9	1.65	3.33	.79	4.97	282	74	-
10	1.08	4.8	2.0	2.8	3.70	5.73	1.01	4.08	287	53	-
15	.08	.7	-7.7	8.4	7.66	15.04	1.26	.38	-	-	-
20	.03	-1.9	.2	-2.1	8.29	16.49	1.34	.14	109	41	-
25	.03	-.5	-.6	.1	8.53	17.27	1.39	.15	68	17	-
30	.01	-1.0	-2.9	1.8	8.75	17.79	1.41	.12	39	18	-
40	.01	-.1	-1.9	1.8	9.53	15.58	1.47	.10	33	18	-
50	.01	-1.2	-.7	-.5	10.05	20.43	1.49	.11	43	19	-
60	.00	.2	-.8	1.0	10.16	20.52	1.43	.11	48	24	-
70	.00	.7	-.3	1.0	10.56	21.50	1.53	.09	59	18	-
80	.00	.8	-.3	1.1	10.91	- .14	1.55	.11	-	-	-
90	.00	3.8	-1.7	5.6	11.11	22.34	1.58	.11	53	21	-
100	.00	2.5	-2.8	5.3	11.46	22.70	1.62	.08	97	26	-

Incident Radiation

Units are Wm^{-2} for hour ending at time indicated. All times are Atlantic Daylight Time

TOTAL RADIATION
ARCTIC CRUISE
July-Sept. 1983

TOTAL	27/7	28/7	29/7	30/7	31/7	01/8	02/8	03/8	04/8	05/8	06/8	07/8	08/8
0000	-	-	-	-	-	-	-	-	-	-	-	-	-
0100	-	-	-	-	-	-	-	-	-	-	-	-	-
0200	-	-	-	-	-	-	-	-	-	-	-	-	-
0300	-	-	-	-	-	-	-	-	-	-	-	-	-
0400	-	-	-	-	-	-	-	-	-	-	-	-	-
0500	-	-	-	-	1	8	13	3	-	1	-	-	-
0600	-	-	3	12	19	47	86	34	5	36	2	29	23
0700	-	15	58	55	69	98	200	128	47	60	12	112	83
0800	-	22	98	120	152	216	312	255	242	233	39	217	107
0900	-	157	107	212	255	213	358	324	407	318	227	180	152
1000	-	370	278	315	442	311	475	355	524	487	393	202	330
1100	-	521	567	435	664	234	542	361	617	384	474	434	366
1200	608	335	696	420	594	350	507	409	669	428	528	504	331
1300	398	557	706	717	575	517	357	502	687	612	578	450	436
1400	435	658	735	597	614	558	141	586	674	628	451	664	293
1500	274	605	523	581	311	587	53	400	621	618	380	629	241
1600	398	538	395	465	344	460	44	158	420	525	239	562	231
1700	393	458	311	274	282	334	27	79	444	311	105	397	114
1800	241	212	221	172	92	222	19	28	263	234	52	322	39
1900	73	127	104	74	21	87	7	10	63	126	29	227	19
2000	10	67	20	8	1	11	-	3	23	46	10	107	88
2100	-	7	-	-	-	-	-	-	-	4	-	12	2
2200	-	-	-	-	-	-	-	-	-	-	-	-	-
2300	-	-	-	-	-	-	-	-	-	-	-	-	-

TOTAL RADIATION
ARCTIC CRUISE
July-Sept. 1983

TOTAL	09/8	10/8	11/8	12/8	13/8	14/8	15/8	16/8	17/8	18/8	19/8	20/8	21/8
0000	-	-	-	-	1	5	15	39	19	5	18	13	M
0100	-	-	-	-	-	1	8	19	6	2	9	4	M
0200	-	-	-	-	-	1	5	10	2	1	3	1	M
0300	-	-	-	-	3	1	5	8	1	-	2	-	M
0400	-	-	-	3	9	6	11	11	1	2	1	1	M
0500	-	2	4	58	14	10	17	26	4	16	6	3	M
0600	11	20	12	37	41	16	33	39	10	39	23	8	M
0700	25	50	28	109	56	41	84	57	17	69	27	19	M
0800	40	107	38	169	68	39	76	75	24	117	37	16	M
0900	60	161	56	267	98	47	102	117	28	136	122	31	M
1000	63	218	96	302	150	65	119	262	37	187	134	49	M
1100	75	236	126	282	185	164	127	314	39	230	101	62	M
1200	121	233	145	312	255	230	179	264	79	347	96	102	M
1300	154	263	179	298	247	217	235	198	103	203	216	129	M
1400	183	213	165	333	289	257	285	145	133	76	118	140	M
1500	206	183	196	332	264	329	256	139	126	243	264	162	M
1600	182	221	201	299	236	247	257	305	103	204	313	176	M
1700	139	260	185	176	147	300	257	286	109	332	171	146	M
1800	92	311	185	82	105	278	283	341	104	217	119	105	M
1900	49	167	229	84	83	118	199	310	91	272	122	85	M
2000	20	116	92	28	62	115	191	214	89	171	105	96	M
2100	6	3	62	18	36	126	124	167	47	103	99	61	M
2200	-	1	7	15	20	99	84	93	20	45	54	58	M
2300	-	-	-	5	12	47	65	43	11	34	31	-	M

TOTAL RADIATION
ARCTIC CRUISE
July-Sept. 1983

TOTAL	22/8	23/8	24/8	25/8	26/8	27/8	28/8	29/8	30/8	31/8	01/9	02/9	03/9
0000	M	M	6	3	3	1	2	3	-	-	-	-	-
0100	M	M	-	-	-	-	-	-	-	-	-	-	-
0200	M	M	-	-	-	-	-	-	-	-	-	-	-
0300	M	M	-	-	-	-	-	-	-	-	-	-	-
0400	M	M	-	-	-	-	-	-	-	-	-	-	-
0500	M	M	-	-	-	-	-	-	-	-	3	2	-
0600	M	M	9	1	3	4	2	3	1	5	14	14	1
0700	M	M	39	7	13	15	15	11	6	14	55	59	15
0800	M	M	61	23	27	27	32	28	9	33	99	80	38
0900	M	M	121	46	59	32	33	57	25	70	145	90	88
1000	M	M	151	93	89	53	67	58	43	101	122	97	138
1100	M	M	147	92	121	63	105	73	63	112	78	119	199
1200	M	M	198	77	142	147	147	110	88	114	108	128	211
1300	M	M	369	126	176	201	188	140	110	181	157	136	117
1400	M	M	298	121	196	187	203	179	112	245	209	150	164
1500	M	M	319	95	182	103	183	114	113	250	250	136	171
1600	M	M	309	130	196	158	190	96	91	241	221	83	183
1700	M	M	287	188	188	120	147	58	85	212	222	46	129
1800	M	M	217	327	180	103	195	27	57	175	121	49	100
1900	M	M	186	257	132	105	224	22	44	85	84	50	58
2000	M	184	116	168	86	67	109	17	28	85	56	34	33
2100	M	118	73	82	60	37	38	17	20	39	29	9	14
2200	M	60	36	57	32	29	28	8	15	22	11	6	1
2300	M	33	16	18	11	13	11	3	4	3	2	1	-

TOTAL RADIATION
ARCTIC CRUISE
July-Sept. 1983

TOTAL	04/9	05/9	06/9	07/9	08/9	09/9	10/9	11/9	12/9	13/9	14/9	15/9
0000	-	-	-	-	-	-	-	-	-	-	-	-
0100	-	-	-	-	-	-	-	-	-	-	-	-
0200	-	-	-	-	-	-	-	-	-	-	-	-
0300	-	-	-	-	-	-	-	-	-	-	-	-
0400	-	-	-	-	-	-	-	-	-	-	-	-
0500	-	-	-	-	-	-	-	-	-	-	-	-
0600	-	-	-	1	-	-	-	-	-	-	-	-
0700	7	4	9	13	5	-	-	2	4	-	-	-
0800	22	19	28	33	25	M	M	17	27	2	4	5
0900	45	41	52	53	54	M	M	54	27	11	15	19
1000	54	77	73	80	160	M	M	112	39	34	29	37
1100	67	110	111	174	188	M	M	169	135	54	47	51
1200	95	139	137	314	181	M	M	222	237	64	84	69
1300	96	186	142	258	145	M	M	227	264	79	95	59
1400	116	176	168	212	187	M	M	262	251	98	150	44
1500	145	148	154	226	200	M	M	248	282	105	232	
1600	135	152	140	181	204	M	M	246	271	96	247	
1700	114	109	80	141	165	M	M	223	231	73	179	
1800	90	67	58	85	105	M	M	179	188	58	64	
1900	49	38	38	52	29	M	M	117	128	46	52	
2000	28	21	20	19	-	-	M	45	77	19	34	
2100	11	9	5	4	-	-	M	4	29	8	14	
2200	1	-	-	-	-	-	-	-	4	3	3	
2300	-	-	-	-	-	-	-	-	-	-	-	

PAR
ARCTIC CRUISE
July-Sept. 1983

PAR	27/7	28/7	29/7	30/7	31/7	01/8	02/8	03/8	04/8	05/8	06/8	07/8	08/8
0000	-	-	-	-	-	-	-	-	-	-	-	-	-
0100	-	-	-	-	-	-	-	-	-	-	-	-	-
0200	-	-	-	-	-	-	-	-	-	-	-	-	-
0300	-	-	-	-	-	-	-	-	-	-	-	-	-
0400	-	-	-	-	-	-	-	-	-	-	-	-	-
0500	-	-	-	-	2	7	9	2	-	-	-	-	-
0600	-	-	2	9	15	34	53	25	4	19	2	17	15
0700	-	10	38	41	51	70	107	93	35	40	10	78	61
0800	-	16	68	89	109	157	230	182	159	154	32	151	76
0900	-	106	83	153	178	155	257	233	257	228	156	125	110
1000	-	257	209	226	296	228	317	255	352	341	275	152	233
1100	-	351	388	307	465	182	361	264	408	271	323	318	258
1200	-	234	477	269	410	251	389	302	441	303	368	361	242
1300	421	371	496	498	358	353	268	375	453	415	412	327	320
1400	279	442	513	414	229	385	112	401	457	418	317	471	217
1500	299	402	362	394	247	418	48	290	438	430	273	441	186
1600	181	375	277	315	201	331	38	135	292	349	184	379	178
1700	91	312	210	186	68	208	24	65	279	205	81	275	113
1800	250	140	141	115	17	57	16	24	167	136	41	207	31
1900	149	87	74	47	2	37	6	3	47	76	24	131	16
2000	45	45	15	6	-	8	-	2	16	33	9	51	8
2100	7	4	-	-	-	-	-	-	6	2	1	6	2
2200	-	-	-	-	-	-	-	-	-	-	-	-	-
2300	-	-	-	-	-	-	-	-	-	-	-	-	-

PAR
ARCTIC CRUISE
July-Sept. 1983

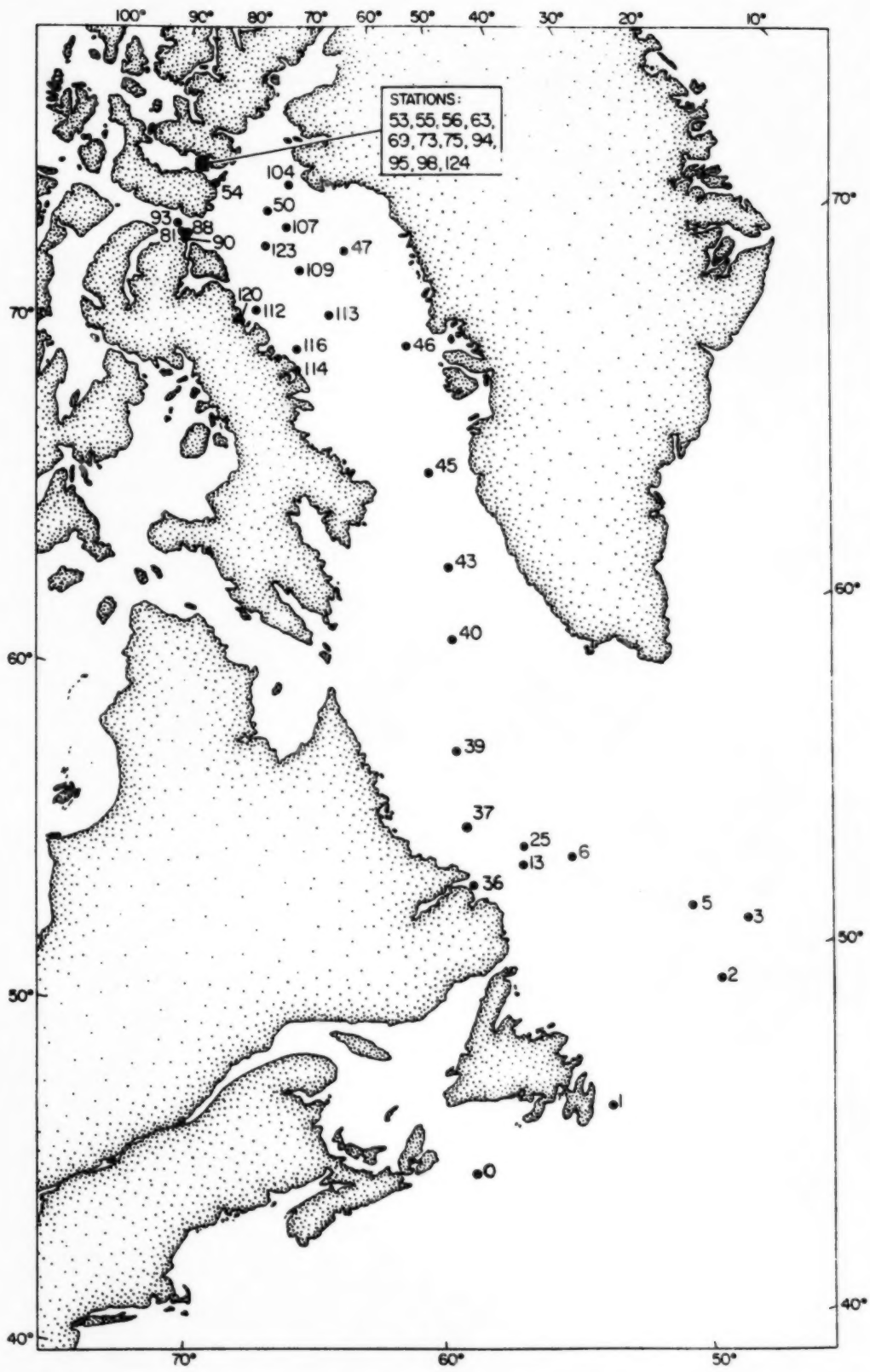
PAR	09/8	10/8	11/8	12/8	13/8	14/8	15/8	16/8	17/8	18/8	19/8	20/8	21/8
0000	–	–	–	–	1	4	12	24	13	4	13	9	9
0100	–	–	–	–	–	1	6	12	5	2	6	3	1
0200	–	–	–	–	–	1	4	6	2	1	2	1	–
0300	–	–	–	–	2	1	4	5	1	1	1	1	–
0400	–	–	–	2	6	5	6	7	1	1	1	1	–
0500	–	2	3	10	10	8	13	14	3	9	4	2	1
0600	8	14	10	27	29	12	24	27	8	25	15	6	5
0700	19	36	21	78	40	30	44	41	14	46	20	13	14
0800	31	76	30	133	51	31	56	50	20	80	30	13	29
0900	47	112	44	172	72	55	70	77	22	99	64	25	37
1000	50	152	72	171	109	51	82	128	30	136	87	39	45
1100	59	170	94	207	133	120	100	151	32	176	75	49	63
1200	93	171	106	208	183	166	135	166	61	217	75	80	143
1300	115	194	131	207	181	157	172	147	80	138	144	98	115
1400	134	158	120	235	203	183	202	111	101	62	89	104	129
1500	150	133	140	229	185	228	184	109	96	181	179	120	127
1600	131	157	141	201	165	171	192	219	80	152	211	130	155
1700	100	177	129	120	106	196	179	221	85	237	121	107	98
1800	67	198	127	60	76	177	191	231	79	154	88	78	74
1900	36	105	138	58	61	85	147	172	68	187	90	63	59
2000	15	64	56	21	45	78	139	117	66	121	72	70	39
2100	5	20	32	14	27	89	93	54	35	80	54	43	31
2200	–	2	6	11	23	61	67	38	16	35	36	39	17
2300	–	–	1	4	9	33	43	28	9	26	21	23	10

PAR
ARCTIC CRUISE
July-Sept. 1983

PAR	22/8	23/8	24/8	25/8	26/8	27/8	28/8	29/8	30/8	31/8	01/9	02/9	03/9
0000	5	1	4	2	1	1	1	1	–	–	–	–	–
0100	1	–	–	–	–	–	–	–	–	–	–	–	–
0200	–	–	–	–	–	–	–	–	–	–	–	–	–
0300	–	–	–	–	–	–	–	–	–	–	–	–	–
0400	–	–	–	–	–	–	–	–	–	–	–	–	–
0500	1	–	1	–	–	–	–	–	–	–	2	1	–
0600	4	5	7	2	3	4	2	3	1	4	9	9	1
0700	10	12	25	6	11	13	11	9	5	12	21	25	11
0800	14	37	46	19	23	22	23	23	9	26	31	38	28
0900	28	58	60	39	47	26	27	42	22	53	72	59	60
1000	40	136	88	68	69	46	53	45	38	73	69	68	111
1100	61	162	104	64	88	51	77	56	49	79	61	86	157
1200	75	206	148	64	105	111	103	83	69	84	84	94	172
1300	97	223	235	95	131	146	131	109	83	139	115	103	74
1400	67	268	209	83	137	132	136	123	82	182	168	107	144
1500	62	261	233	75	134	80	134	80	85	188	172	93	143
1600	65	187	221	99	139	121	135	70	68	173	173	60	129
1700	74	229	211	134	137	82	105	40	64	157	157	36	97
1800	52	193	135	202	119	76	125	21	42	130	88	39	65
1900	48	96	132	162	89	74	130	18	33	62	58	36	40
2000	51	93	77	108	59	44	52	14	21	56	39	22	23
2100	28	79	50	61	41	25	29	13	14	27	19	8	9
2200	15	39	24	33	21	14	19	6	10	11	7	4	1
2300	7	18	10	11	6	7	7	2	2	2	1	–	–

PAR
ARCTIC CRUISE
July-Sept. 1983

PAR	04/9	05/9	06/9	07/9	08/9	09/9	10/9	11/9	12/9	13/9	14/9	15/9
0000	–	–	–	–	–	–	–	–	–	–	–	–
0100	–	–	–	–	–	–	–	–	–	–	–	–
0200	–	–	–	–	–	–	–	–	–	–	–	–
0300	–	–	–	–	–	–	–	–	–	–	–	–
0400	–	–	–	–	–	–	–	–	–	–	–	–
0500	–	–	–	–	–	–	–	–	–	–	–	–
0600	1	–	1	1	–	–	–	–	–	–	–	–
0700	7	4	8	11	5	9	2	2	4	–	–	–
0800	19	16	24	25	22	29	9	14	19	6	3	4
0900	36	33	40	41	43	62	20	46	20	15	12	17
1000	43	58	55	61	95	86	34	86	13	27	23	28
1100	53	82	82	131	124	122	48	127	88	43	37	41
1200	73	105	98	217	119	98	71	171	149	43	61	49
1300	73	130	105	161	104	127	93	184	180	59	70	43
1400	88	131	117	148	145	119	118	204	174	69	92	35
1500	110	103	111	146	158	98	189	196	184	81	98	
1600	97	113	92	132	144	89	187	191	168	65	60	
1700	80	76	56	96	115	69	120	165	135	52	93	
1800	62	47	42	59	111	72	57	126	102	41	51	
1900	34	28	26	33	67	34	59	69	66	31	36	
2000	19	15	13	12	17	13	20	22	31	13	22	
2100	7	6	3	3	2	3	8	3	10	8	9	
2200	–	–	–	–	–	–	–	–	1	1	2	
2300	–	–	–	–	–	–	–	–	–	–	–	



Location of sampling stations.